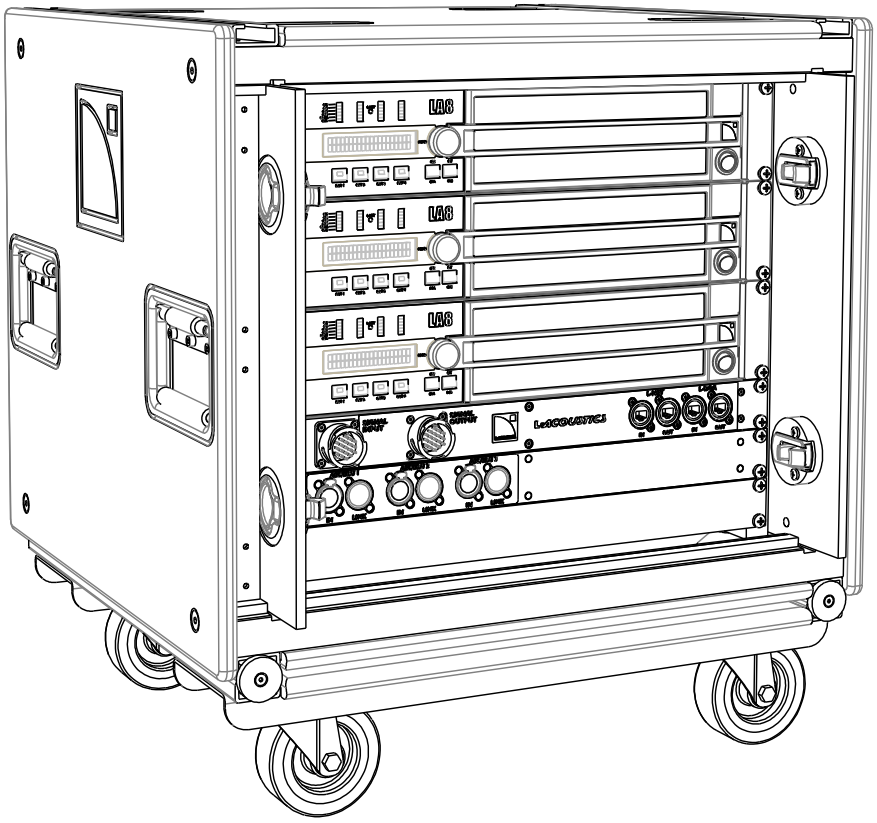
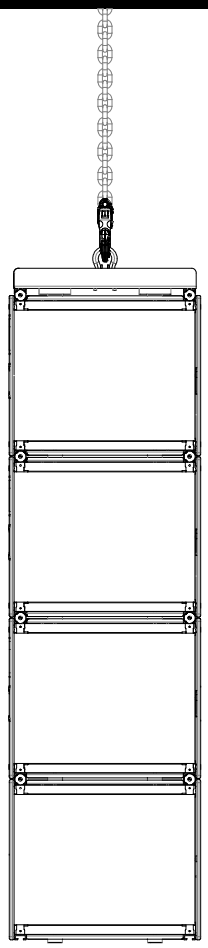
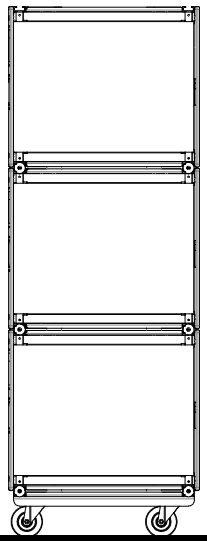
LA-RAK TOURING RACK

USER MANUAL

VERSION 2.0







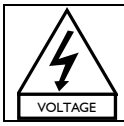
1 SAFETY WARNINGS

All information hereafter detailed applies to the **L-ACOUSTICS® LA-RAK Touring Rack**, designated in this section as **the product**. The LA-RAK product includes the following components: a **RK 9U** cabinet, three **LA8** amplified controllers and three distribution panels **(LA-POWER**, **LA-PANEL** and **LA-PANEL AES3**).

1.1 Symbol description

1.1.1 Symbols employed in this manual

Throughout this manual the potential risks are indicated by the following symbols:



The VOLTAGE symbol indicates a potential risk of electric shock that could be life threatening. In addition, the product may also be seriously damaged.

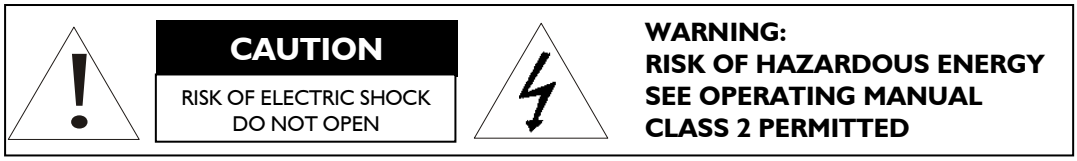
The WARNING symbol indicates a potential risk of physical harm to the user or people within close proximity to the product. In addition, the product may also be damaged.

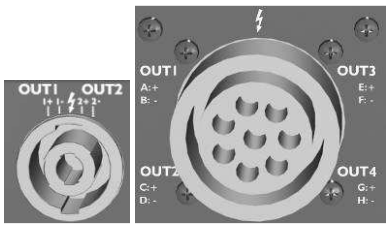
The CAUTION symbol notifies the user about information to prevent possible product damage.

The IMPORTANT symbol is a notification of an important recommendation of use.

1.1.2 Symbols indicated on the product

As the product is an electrical device, it represents potential hazard for the user. For this reason the user may pay particular attention to the symbols that are indicated on the covers of the product electrical components:





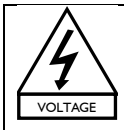
On the rear panel of the LA8 amplified controllers, the lightning flashes symbols next to the 4-point SpeakON® and 8-point CA-COM® connectors indicate that the product can deliver high output voltages that are potentially life threatening. Connections between the product and a speaker should always be done with an all ready-made lead. When the amplified controller is operating, never attempt to touch any exposed speaker wire without disconnecting the connector first.

1.2 Important safety instructions

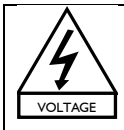
1. **Read this manual**
2. **Heed all safety warnings**
3. **Follow all instructions**
4. **The user should never incorporate equipment or accessories not approved by L-ACOUSTICS®**

5. Environments
Use the product only in E1, E2, E3, or E4 environments according to EN55103-2 standard.

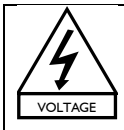
6. Radio interference
A sample of this product has been tested and complies with the limits for the EMC (European Electro Magnetic Compatibility) directive. These limits are designed to provide reasonable protection against harmful interference from electrical equipment. However, there is no guarantee that interference will not occur in a particular installation.



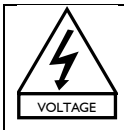
7. Power cord caution
Do not use the product if any power cord is broken or frayed.
Protect any power cord from being walked upon or pinched, particularly at the plugs and the points where the power cords exit from the apparatus.



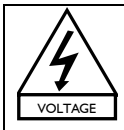
8. Mains supply
Only connect the product to an appropriate three-phase AC circuit and outlet. Consult an electrician if the output voltage of the local AC mains is not known. Any electric device must be approved for the local voltage & current rating. The specific electrical safety regulations of the country of use must be strictly applied. Warranty will not cover damages caused by a mains wiring error.



9. Grounding
The product may only be connected to mains power supply tied to earth. If the local outlet is obsolete, consult an electrician.
The LA-POWER is fitted with grounding-type sockets. Do not defeat the earth connections between the sockets and the product chassis.



10. Lightning storms
During lightning storms, disconnect the product from mains.
Switching the amplified controllers off does not disconnect them from mains. Therefore, disconnecting can only be achieved by removing the LA-POWER three-phase male plug from mains.



11. Interconnections
Before connecting the product to other equipment, turn the power off and unplug all of the equipment from the supply source. Failure to do so may cause an electric shock and serious personal injury. Read the user manual of the other equipment carefully and follow the manufacturer instructions.
Do not connect any amplified controller output to the output of another amplifier or to other voltage source (such as a battery, mains source, or power supply), regardless of whether the product is turned on or off.

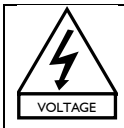
12. Over power risks
The product is very powerful and can be potentially dangerous to both loudspeakers and humans alike. Even when using the product's front panel attenuator to reduce the gain, it is still possible to reach full output power if the input signal level is high enough.

13. Ventilation

Openings in the LA8 amplified controller chassis are provided for ventilation. To prevent overheating and ensure reliable operation, these openings must not be blocked or covered. The product should be installed in accordance with the manufacturer instructions given in this manual.

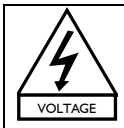
14. Heat

Do not operate the product near any heat source, such as radiators or other devices.



15. Water and moisture

To prevent fire or shock hazard, do not expose the product to rain or moisture.
Do not use the product near water.
Do not operate the product while wet.

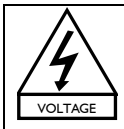


16. Interference with external objects and/or liquids

Never push objects of any kind into the product through openings as they may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on the product.

17. Cleaning

Unplug the product from the mains power supply before cleaning.
Do not use liquid or aerosol cleaners.
Use only dry cloth when cleaning any electrical component.



18. Servicing and replacement parts

Do not attempt to service any product component as removing covers may expose to dangerous voltage or other hazards.
All service and repair work must be carried out by an L-ACOUSTICS® authorized dealer.
The use of unauthorized replacement parts may result in injury and/or damage through fire, electric shock, or other electricity-related hazards.

19. Conditions which require immediate service

Servicing is required when the product has been damaged in any way such as:

- Any power supply cord or socket is damaged.
- Liquid has been spilled or an object has fallen into any electrical component.
- The product has been exposed to rain or moisture.
- The product was dropped or the housing is damaged.
- The product does not operate normally.

20. System parts and rigging inspection

All system components must be inspected before use in order to detect any possible defect.
Please refer to the "Care and Maintenance" section of this manual as well as any other manuals pertaining to the system for a detailed description of the inspection procedure.
Any part showing any sign of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.

21. Mounting instructions

Do not place the product on an unstable cart, stand, tripod, bracket, or table. The product may fall and be seriously damaged, and may cause serious human injury. Mounting of the product should follow the manufacturer instructions and should use the mounting accessories recommended by the manufacturer, as described in this manual.

22. Personnel qualification

Installation of an assembly should only be carried out by qualified personnel that are familiar with the rigging techniques and safety recommendations outlined in this manual. Any part showing any sign of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.

23. Personnel health and safety

During installation of an assembly, personnel should wear protective headgear and footwear at all times.
Under no circumstances personnel should climb on the assembly.

24. Additional rigging equipment

L-ACOUSTICS® is not responsible for any rigging equipment and accessory that is not manufactured by L-ACOUSTICS®.
It is the user's responsibility to ensure that the Working Load Limit (WLL) of all additional hardware rigging accessories is greater than the total weight of the rack assembly in use.

25. Suspension points

It is the user's responsibility to ensure that the Working Load Limit (WLL) of the suspension points and/or chain hoists is greater than the total weight of the assembly in use.

26. System load capacity and setup safety limits

Load capacity and setup safety limits outlined in this manual must never be exceeded.

27. Local regulations

Some countries require higher Ultimate Strength Safety Factors and specific rigging approvals. It is the user's responsibility to ensure that any overhead suspension of L-ACOUSTICS® systems has been made in accordance with all applicable local regulations.
As a general rule, L-ACOUSTICS® recommends the use of safety steel at all times.

28. Flying an assembly

Always ensure that nobody is standing underneath an assembly when it is being raised.
As the assembly is being raised, check each individual rack to make sure that it is securely fastened to the component above. Never leave the system unattended during the installation process.

29. Ground stacking an assembly

Do not ground stack an assembly on uneven ground or platform.
If the assembly is ground stacked on a structure, platform, or stage, always check that this last can support the total weight of the system.
Secure the assembly to the structure, platform, or stage using ratchet straps or any other applicable device.

30. Dynamic load

When an assembly is deployed in an open air environment, wind effects should be taken into account. Wind can produce dynamic stress to the rigging components and suspension points. If the wind force exceeds 6 bft (Beaufort scale) it is highly recommended to lower down and/or secure the assembly.

31. Manual

Keep this manual in a safe place during the product lifetime.
This manual forms an integral part of the product.
Reselling of the product is only possible if the user manual is available.
Any changes made to the product have to be written in this manual, particularly in the event of resale.

1.3 EC declaration of conformity

L-ACOUSTICS®

13 rue Levacher Cintrat
Parc de la Fontaine de Jouvence
91462 Marcoussis Cedex
France

States that the following products:

LA-RAK touring rack, composed of:

- Rack cabinet, RK 9U;
- Amplified controllers, LA8;
- Distribution panels, LA-POWER, LA-PANEL and LA-PANEL AES3.

LA-RAK BUMP flying frame.

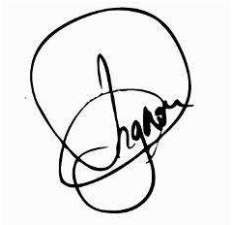
Are in conformity with the provisions of:

98/37/EC: Machinery Directive;
73/23/EC: Low Voltage Directive;
89/336/EC: Electromagnetic Compatibility Directive.

Applied rules and standards:

EN ISO 12100-1: 2004: Safety of machinery;
DIN 18800: Steel Structures;
BGV-C1: Germany safety regulation for overhead rigging;
EN60065: Safety requirements for audio, video and similar electronic apparatus;
EN55103-1: Electromagnetic Interference (Emission);
EN55103-2: Electromagnetic Susceptibility (Immunity).

Established at Marcoussis, France
June 2nd, 2008



Christophe Pignon

2 CONTENTS

1 SAFETY WARNINGS 1
1.1 Symbol description 1
1.2 Important safety instructions 2
1.3 EC declaration of conformity 5

2 CONTENTS 6

3 INTRODUCTION 7
3.1 Welcome to L-ACOUSTICS® 7
3.2 Unpacking 7
3.3 Cross-references 8
3.4 Web links 8

4 SYSTEM APPROACH BY L-ACOUSTICS® 9
4.1 LA-RAK as a signal, network and power distribution system 9
4.2 L-ACOUSTICS® components related to LA-RAK 9
4.3 Supported configurations 11

5 LA-RAK TOURING RACK 12
5.1 Global architecture 12
5.2 RK 9U 13
5.3 LA8 amplified controllers 14
5.4 LA-POWER 14
5.5 LA-PANEL 15
5.6 LA-PANEL AES3 15

6 INSTALLATION 16
6.1 Mounting components inside the LA-RAK 16
6.2 Moving and transporting the LA-RAK 16
6.3 Amp cooling 16
6.4 Rigging the LA-RAK 18
6.5 Connecting LA-RAK to AC mains 25
6.6 Analog audio cabling 27
6.7 Digital audio cabling 30
6.8 Loudspeaker cabling 34
6.9 L-NET network cabling 35

7 CARE AND MAINTENANCE 38
7.1 Maintenance information 38
7.2 Checking procedures 38
7.3 Network cables replacement procedure 39
7.4 Spare parts and recommended tools 39

8 SPECIFICATIONS 40

9 APPENDIX: LA-POWER US 43
9.1 LA-RAK and LA-POWER US presentation 43
9.2 Connecting LA-RAK US to AC mains 43

3 INTRODUCTION

3.1 Welcome to L-ACOUSTICS®

Thank you for purchasing the **L-ACOUSTICS® LA-RAK Touring Rack**.

This manual contains essential information on installing and operating the product correctly and safely. Read this manual carefully in order to become familiar with these procedures.

As part of a continuous evolution of techniques and standards, L-ACOUSTICS® reserves the right to change the specifications of the product and the content of this manual without prior notice.

Should the product requires repair or if information about the warranty is needed, please contact an approved L-ACOUSTICS® distributor. In order to obtain the address of the nearest distributor go to the L-ACOUSTICS® web site.

3.2 Unpacking

Carefully open the shipping carton and check the product for any noticeable damage. Each L-ACOUSTICS® product is tested and inspected before leaving the factory and should arrive in perfect condition.

If found to be damaged, notify the shipping company or the distributor immediately. Only the consignee may initiate a claim with the carrier for damage incurred during shipping. Be sure to save the carton and packing materials for the carrier's inspection.

The **LA-RAK package** consists of the following components (see from Figure 4 to Figure 7):

- One **L-ACOUSTICS® RK 9U** cabinet with front and rear LEXAN® doors, one detachable **dolly board** and two **coupling bars**.
- Three **L-ACOUSTICS® LA8** amplified controllers equipped with the LA-AES3 board.
- One **L-ACOUSTICS® LA-POWER**.
- One **L-ACOUSTICS® LA-PANEL** analog signal and network distribution panel, with eight **XLR cables** and six **CAT5e U/FTP cables**.
- One **L-ACOUSTICS® LA-PANEL AES3** digital signal distribution panel.

The power distribution panel must be adapted to the mains rating of the country of use.

- In Europe use the LA-POWER device (230 V version) presented all along this manual.
- In USA use the LA-POWER US device (120 V version) presented in Appendix.
- In any other country contact a local L-ACOUSTICS® distributor.

The optional **LA-RAK BUMP package** consists of the following components (see Figure 13):

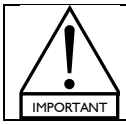
- One **L-ACOUSTICS® LA-RAK BUMP** flying frame.
- Two ⅝" shackles.

3.3 Cross-references

All along the manual, a bracketed number refers to a section. For example, [3.3] stands for the present section: **Cross-references**.

3.4 Web links

Please check the L-ACOUSTICS® web site on a regular basis for latest document and software application updates. Table 1 provides links for all downloadable items mentioned in this manual.



ALWAYS refer to the latest document version.
ALWAYS use the latest software application version.

Table 1: Links to documents and software applications

Generic path for all products	www.l-acoustics.com/ +product name
LA8 User manual **LA8 FIRMWARE Pack** **LA8 PRESET LIBRARY Pack**	www.l-acoustics.com/la8
LA-RAK User manual **LA-RAK Spec sheets**	www.l-acoustics.com/la-rak
LA8 PACOM CABLES Technical bulletin	www.l-acoustics.com/download (Technical publications)
LA NETWORK MANAGER User manual	www.l-acoustics.com/la-network-manager

4 SYSTEM APPROACH BY L-ACOUSTICS®

4.1 LA-RAK as a signal, network and power distribution system

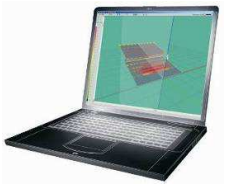
The **L-ACOUSTICS® LA-RAK Touring Rack** is a central element of the L-ACOUSTICS® system architecture built upon the LA8 amplified controller. It offers an advanced rack solution for all L-ACOUSTICS® systems covering signal, power and network distribution in a comprehensive plug and play touring package. LA-RAK was created as a universal platform designed to facilitate cross-rental and to ensure compatibility with the legacy cabling standard of L-ACOUSTICS® systems.

4.2 L-ACOUSTICS® components related to LA-RAK

The system approach developed by L-ACOUSTICS® consists in providing all the components needed to offer the highest, most predictable level of performance. Here are the main components that can be used when setting an L-ACOUSTICS® system with LA-RAK (see Figure 1):

8XT, 8XTi, 12XT, 12XTi, 115XT HiQ	2-way coaxial enclosures
KIVA, KARA®, KARAi®, dV-DOSC, ARCS®	2-way WST® enclosures
K1, KUDO®, V-DOSC®	3-way WST® enclosures
K1-SB, dV-SUB	Subwoofer extensions for K1 and dV-DOSC, respectively
SB18, SB18i, SB28	Subwoofer enclosures
LA NETWORK MANAGER	Remote control software
SOUNDVISION	Acoustical and mechanical 3D modeling software

A complete L-ACOUSTICS® system also features standard L-ACOUSTICS® cables and rigging accessories. For more details refer to the appropriate manuals [3.4].


SOUNDVISION

LA NETWORK MANAGER

LA-RAK

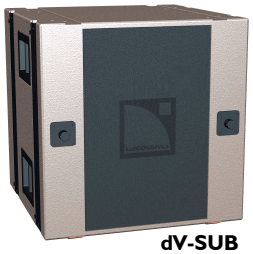
8XT 8XTi

12XT 12XTi

KILO

115XT HiQ

KIVA


dV-SUB

KUDO

ARCS

V-DOSC

SB18

dV-DOSC

K1

SB18i

KARA

KARAi

K1-SB

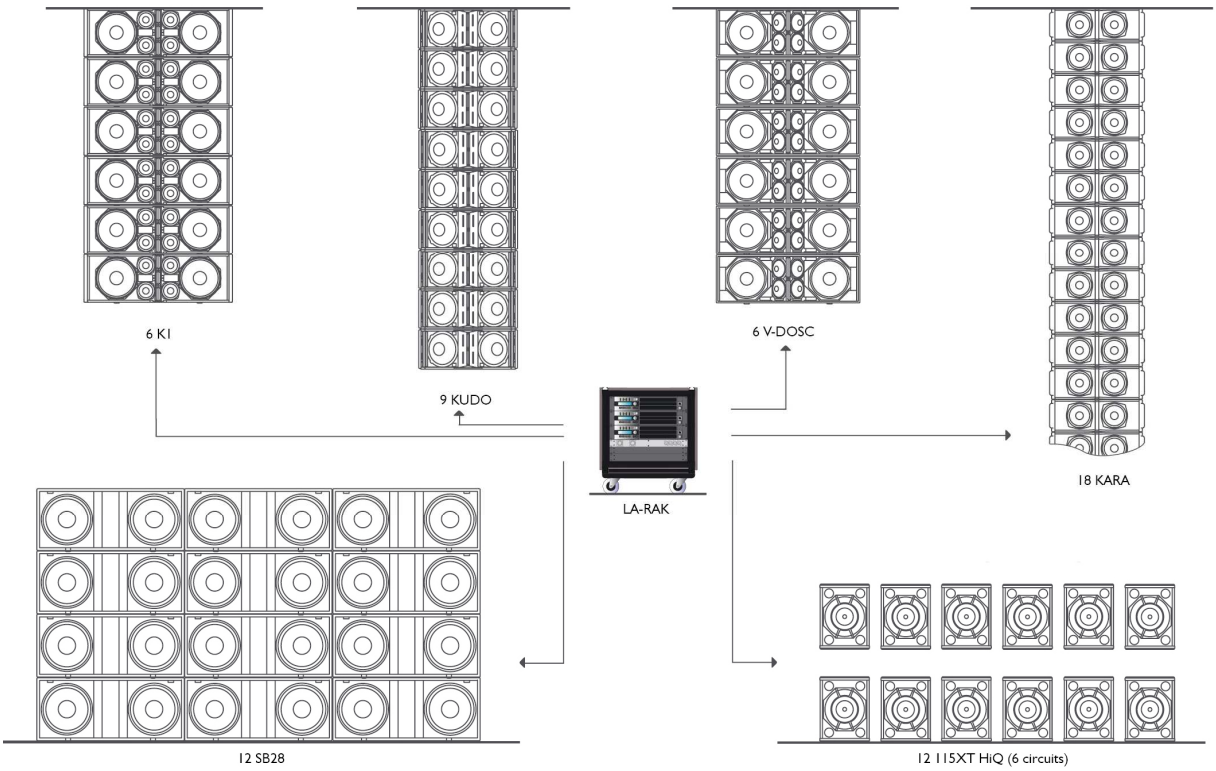
SB28

Figure 1: Main system components related to the LA-RAK

4.3 Supported configurations

The LA-RAK working principle is entirely modular, so that the engineer can physically assemble and interconnect multiple elements to fit numerous applications. The LA-RAK configuration based on a multiple of 3 LA8 yields the maximum flexibility and power resources for any L-ACOUSTICS® system, from compact coaxial systems up to KUDO® and K1 stadium line source array systems. Some examples are illustrated in Figure 2:

LA-RAK power capacity (each of the represented systems can be driven by one LA-RAK)



LA-RAK flexibility (split 2/3-1/3, two LA8 driving a main system, one LA8 driving sub companions)

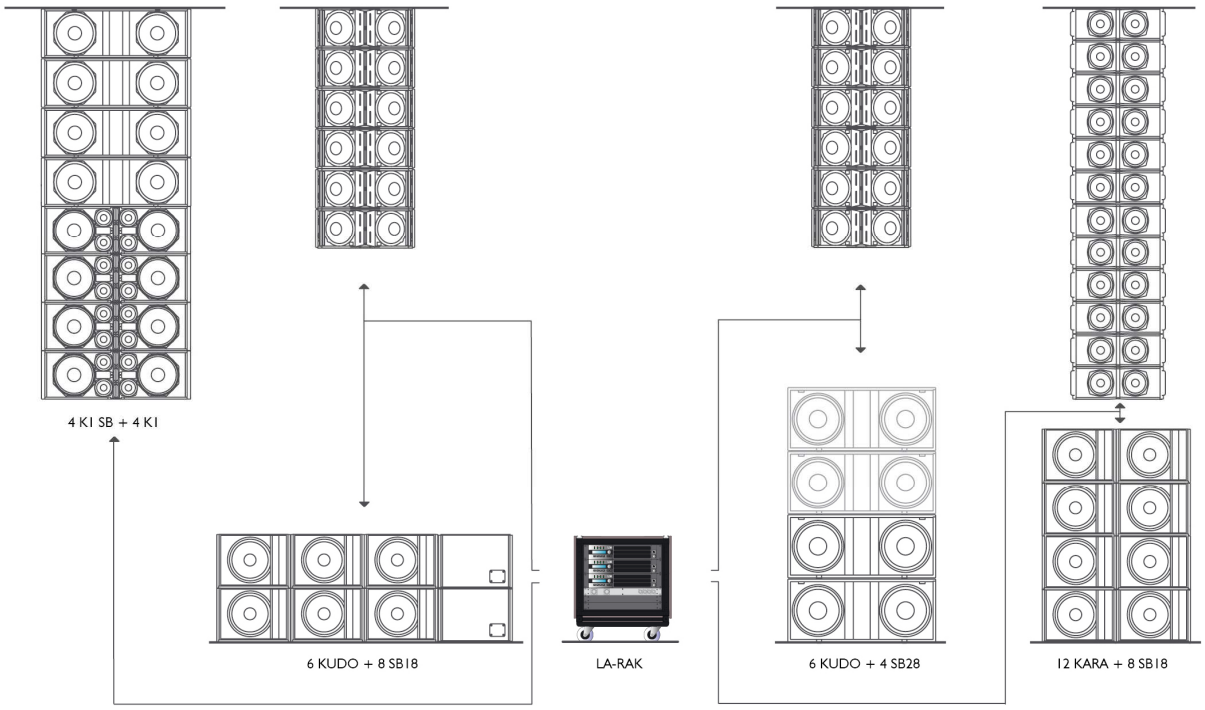


Figure 2: Power capacity and flexibility of the LA-RAK

5 LA-RAK TOURING RACK

5.1 Global architecture

The **L-ACOUSTICS® LA-RAK** is a 9U rack cabinet in which are mounted three LA8 amplified controllers, as well as three distribution panels: LA-POWER for power, LA-PANEL for analog signals and network, and LA-PANEL AES3 for digital audio signals.

Front

Rear

Figure 3: Equipped LA-RAK

5.2 RK 9U

The **L-ACOUSTICS® RK 9U** cabinet is a dual structure consisting of a rubber shock inner steel frame braced by an external aluminum frame sided with highly resistant polyethylene panels. This ensures structural integrity while offering decoupling and maximum protection of the electronics inside the rack. Two retractable LEXAN® doors protect the internal components during transport.

On the front face, one extra U space can be fitted with a shelf to receive an additional switch, for L-NET network star topologies for instance.

On the rear face, two hinge-mounted panels cover and protect the analog, digital and network connectors of the amplified controllers to create a neat and tangle-free cable environment. The rear central part of the amplified controllers remains accessible with its CA-COM® and SpeakON® sockets.

The RK 9U is equipped in standard with a detachable transport dolly board and two coupling bars. These last also allow arraying several LA-RAK in flown or stacked configurations.

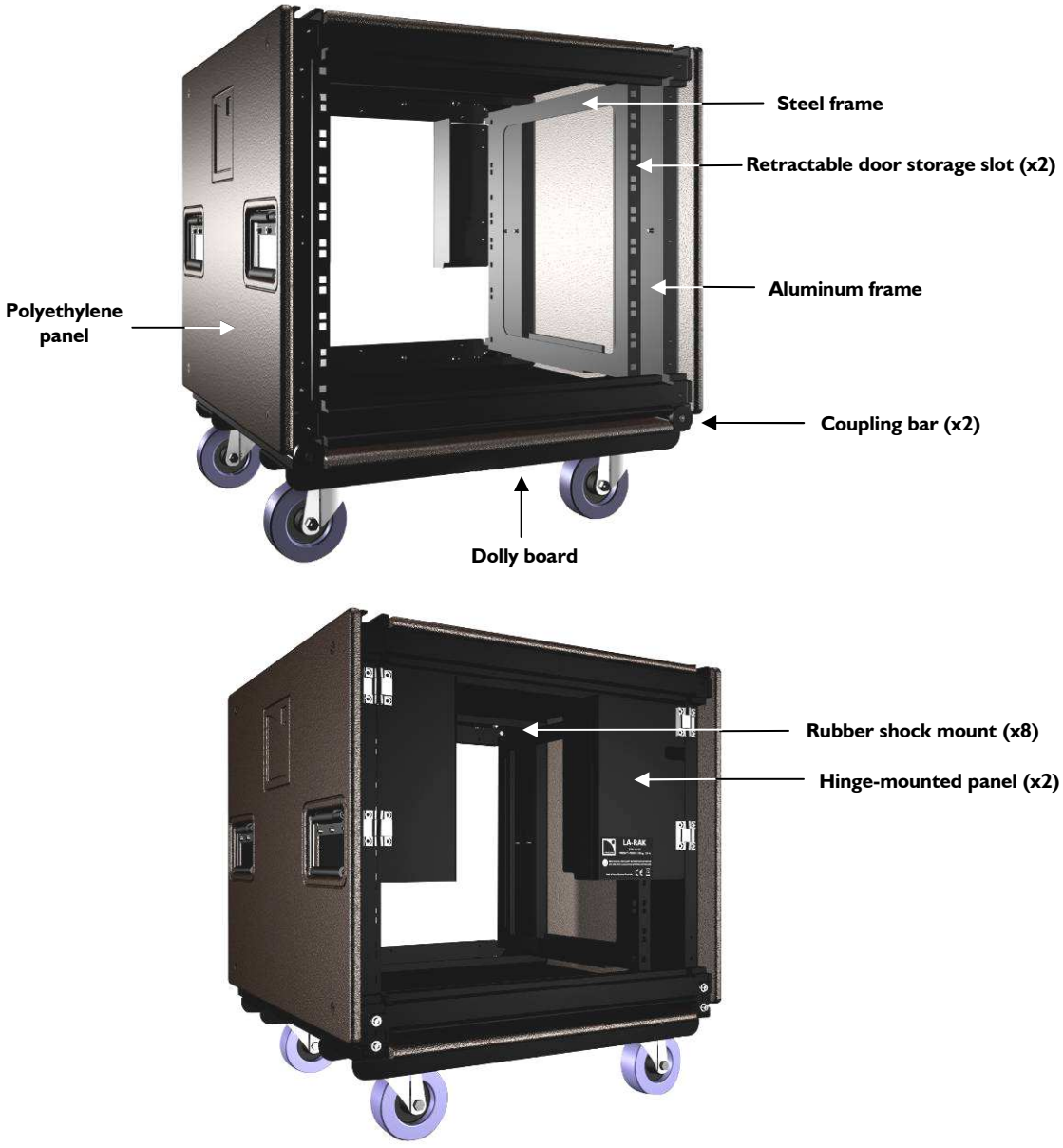


Figure 4: The RK 9U cabinet

5.3 LA8 amplified controllers

The **L-ACOUSTICS® LA8** amplified controller is the top of the range of high-end integrated controllers entirely dedicated to the comprehensive operation of L-ACOUSTICS® loudspeaker systems. In a 2U lightweight chassis, the LA8 combines the resources of a 2 x 4 DSP engine driving four channels of amplification and delivering up to 1800 W per channel at 4 ohms. It features a storage capacity of 99 presets, a user-friendly front panel interface, two I/O Ethernet® connection ports for network remote control, a connection panel for analog audio inputs, an LA-AES3 board for digital audio inputs and a connection panel for speaker outputs. Refer to **LA8 User manual** [3.4] for more details.

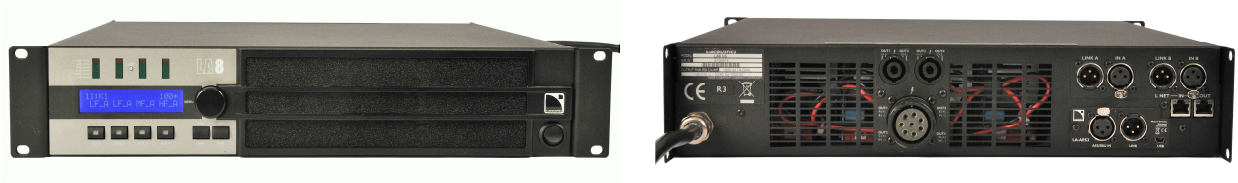


Figure 5: The LA8 amplified controller

5.4 LA-POWER

The **L-ACOUSTICS® LA-POWER** is a 2U/19" I/O 230 V power distribution panel featuring a 32 A three-phase circuit: one IN plug and one LINK OUT outlet to power a secondary rack. This configuration allows the power to be automatically balanced with an even number of LA8 per phase.

Three "Shuko" AC outlets (L1, L2, and L3) are available for LA8, and three additional outlets (1 x "Shuko" and 2 x IEC) are available to power auxiliary accessories such as Ethernet® switches, portable computer, and the like. All circuits are protected by discrete circuit breakers and three LED help monitor phase presence.

Note: The three LA8 AC outlets can be replaced by a 3 x 20 A Powercon® plate using the predrilled template fitted with four M5 screws (the "M5" notation refers to the European standard, see applicable external documentation).

Note: See Appendix 0 for LA-POWER US description or contact a local L-ACOUSTICS® representative for any country located outside Europe and USA.

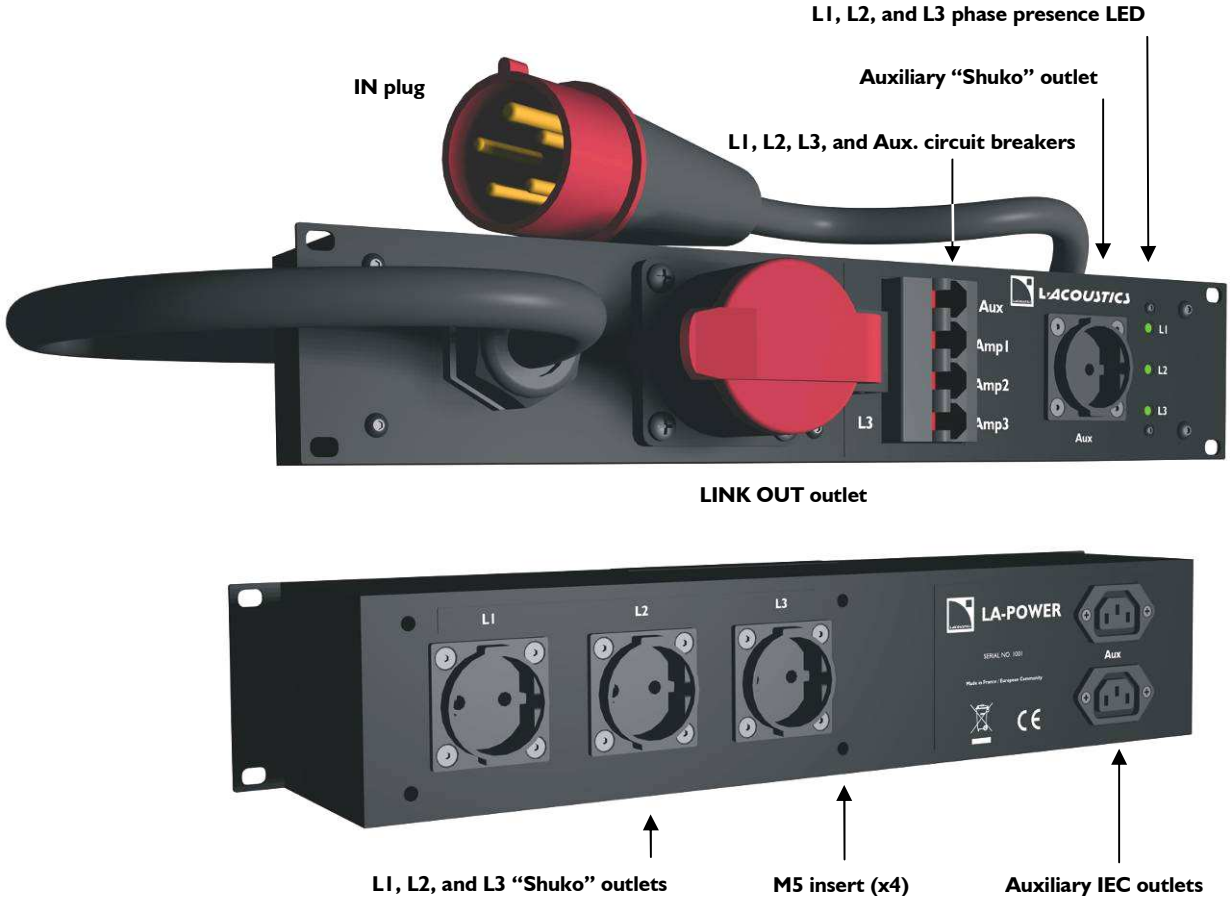


Figure 6: The LA-POWER

5.5 LA-PANEL

The **L-ACOUSTICS® LA-PANEL** allows distribution of 6 analog audio signals. The LA-RAK is fed with the signals through the SIGNAL INPUT 19-point PA-COM® connector. The signals can be distributed to the 3 amplifiers thanks to 6 OUT XLR3 connectors on the rear side of the panel. The SIGNAL OUTPUT 19-point PA-COM® connector allows sending the 6 signals to another LA-RAK in a daisy-chain layout. The PA-COM® connectors ensure compatibility with the L-ACOUSTICS® cabling standard (DOM2, DOM30, DOMF, and DOMM cables).

The panel also features 4 Ethercon® I/O sockets for L-NET control & monitoring network and L-DGA digital audio network (for future applications).

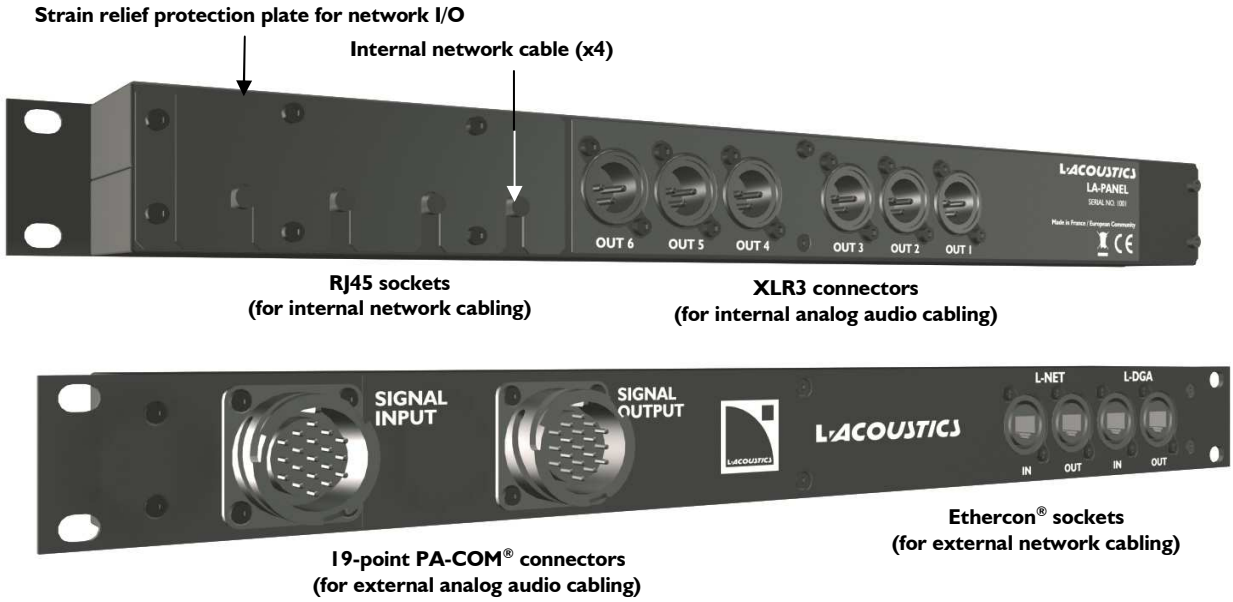


Figure 7: The LA-PANEL

5.6 LA-PANEL AES3

The **L-ACOUSTICS® LA-PANEL AES3** allows distribution of 6 digital audio signals. The LA-RAK is fed with AES/EBU signals through 3 IN XLR3 connectors, each of them receiving 1 digital signal conveying 2 audio channels. The signals can be distributed to the 3 amplifiers thanks to 3 OUT XLR3 cables integrated on the rear side of the panel. In order to set a daisy-chain layout, the 3 LINK XLR3 cables allow routing pairs of channels from the LINK connector of the amplifiers to the corresponding LINK XLR3 connector on the front side of the LA-PANEL AES3.
Also are provided 2 extra XLR cables, to connect LINK and IN connectors on the front of the panel. This operation allows setting a daisy-chain between controllers within the LA-RAK (see [6.7]).

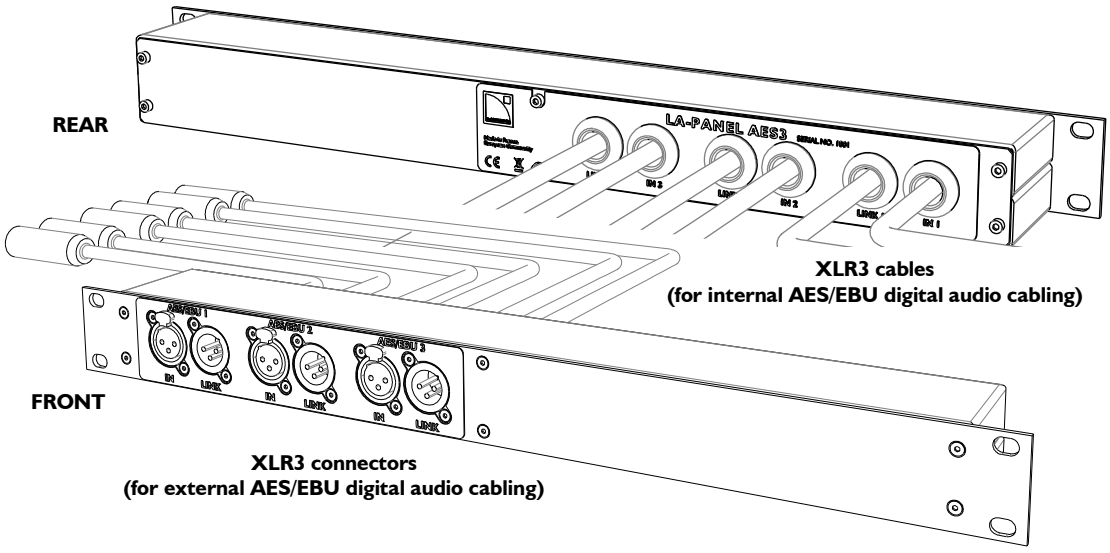


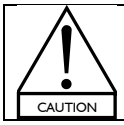
Figure 8: The LA-PANEL AES3

6 INSTALLATION

6.1 Mounting components inside the LA-RAK

The **9U inner frame** (see Figure 4) is for mounting components to both front and rear faces:

- The LA-PANEL, the LA-PANEL AES3 and optional switches mount to the front face using four screws and four washers each.
- The LA-POWER mounts to the rear face using four screws and four washers.
- Each LA8 mounts to both front and rear faces using eight screws and eight washers.



During transport or while on tour it is essential that the LA8 controllers are rear supported in addition to the front panel mounting. Use the rear rack support brackets provided with each LA8 or the LA-RAK optional spacers (see references in section [7.4]).

6.2 Moving and transporting the LA-RAK

The **removable dolly board** (see Figure 10) is for moving and transporting a vertical array of two LA-RAK. It secures to the bottom LA-RAK using two **coupling bars** (see [6.4]).

For moving or transporting purposes, a maximum of **two LA-RAK** can be set onto **one dolly board**.

6.3 Amp cooling

Each LA8 amplified controller uses a forced air cooling system to maintain a low and even operating temperature. All fan cooled L-ACOUSTICS® amplified controllers have front to rear airflow.

Before operation, ensure that the front filter system of each LA8 is clean and dust free (see the **LA8 User Manual** [3.4]).
While operating keep the LEXAN® front and rear doors retracted (see below) and do not block the LA8 front and rear air vents.

Apply the following procedure to retract and lock the LEXAN® doors:

a. Detach both doors and slide them along both LA-RAK sides (between the outer aluminum frame and the inner steel frame).

b. Insert and lock both ball locking pins through each door's bottom hole.

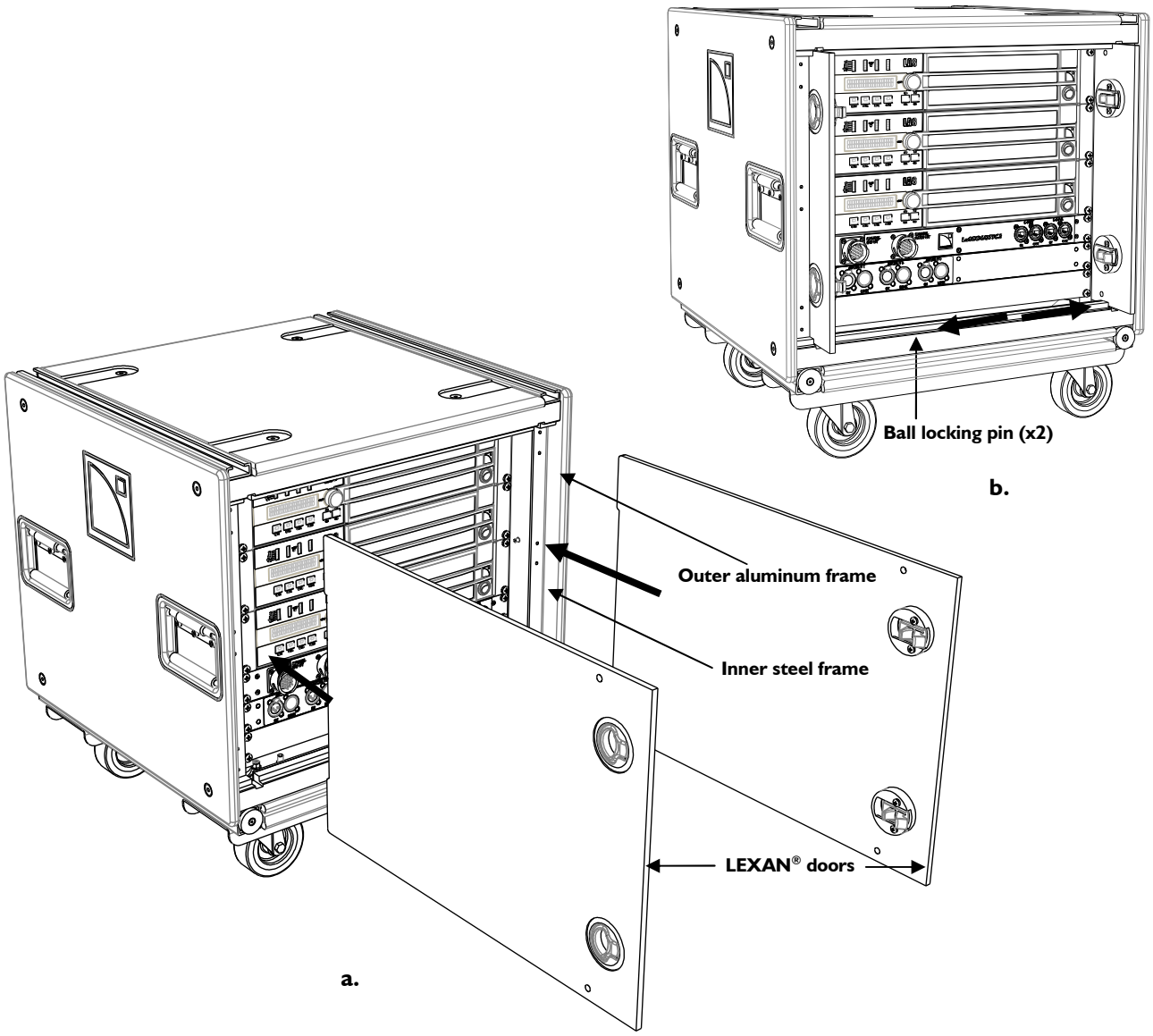


Figure 9: Retracting and locking both LEXAN® doors

6.4 Rigging the LA-RAK

The LA-RAK features four fully integrated rigging rails on top and bottom faces as well as four stacking runners which mate with four runner guides. These are for assembling several LA-RAK in stacked or flown configurations such as:

- Stacking a vertical array of up to 3 LA-RAK onto one **dolly board**;
- Flying a vertical array of up to 4 LA-RAK underneath the **L-ACOUSTICS® LA-RAK BUMP** flying frame or onto the **L-ACOUSTICS® K1-BUMP** flying frame.

6.4.1 Stacking procedure

All along the procedure:
- Strictly follow the sequence of the successive steps.
- Systematically ensure that each spring-loaded safety is in locking position.

1. Bring a first LA-RAK at the stacking location.

2. Bring a second LA-RAK and remove its dolly board:
   a. Turn a spring-loaded safety and slide out the coupling bar.
   b. Repeat for the second coupling bar.

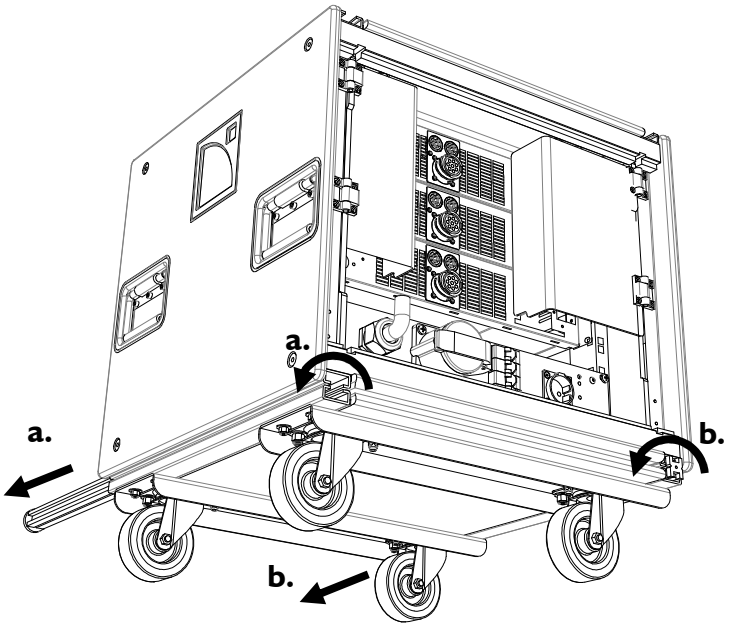


Figure 10: Removing the dolly board from the LA-RAK

3. Lift up the second LA-RAK and install it on the first one: align the rails and set the stacking runners into the runner guides.

4. Secure the second LA-RAK to the first one:

a. Turn a spring-loaded safety and slide the coupling bar in along the rails until the safety has returned to locking position (a click should be heard).

b. Repeat for the second coupling bar.

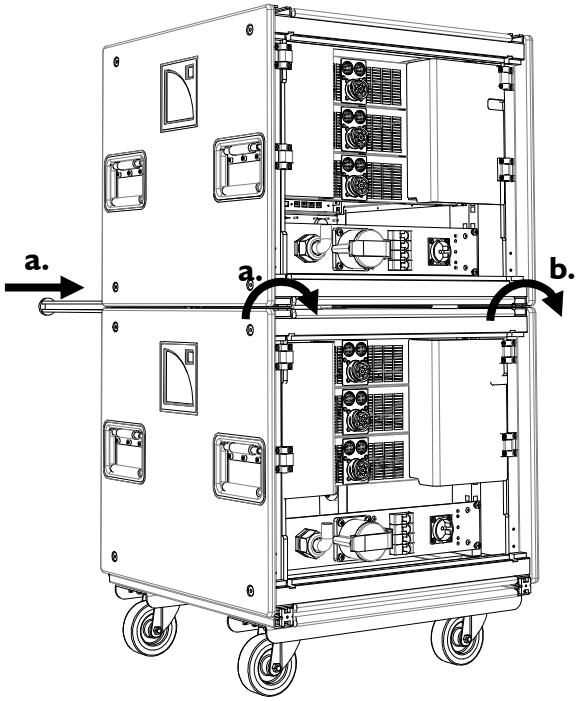


Figure 11: Rigging a second LA-RAK

5. Secure a third LA-RAK by repeating the steps from 2 to 4.

WARNING

A maximum of **three LA-RAK** can be **stacked** onto one dolly board.

Secure the stacked LA-RAK assembly to the structure, platform, or stage using ratchet strap or any other applicable device.

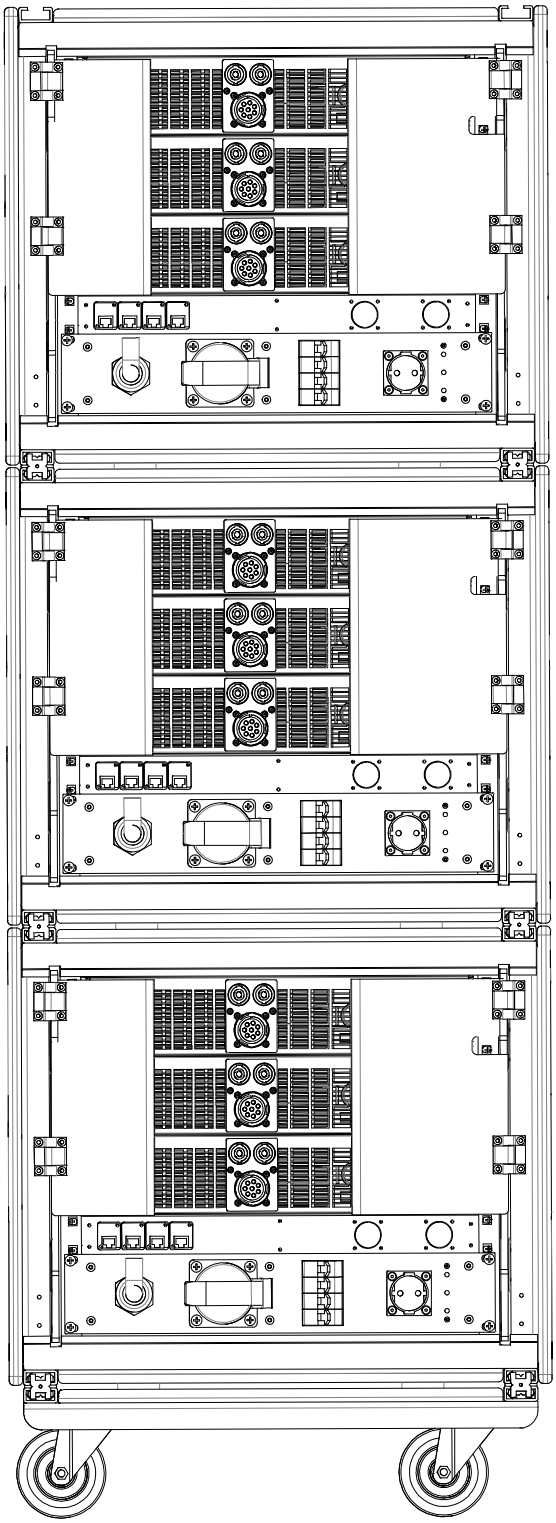


Figure 12: Three stacked LA-RAK (maximum configuration)

6.4.2 Flying procedure using the LA-RAK BUMP

The **L-ACOUSTICS® LA-RAK BUMP** flying frame is engineered to fly 4 LA-RAK for a drive capacity of up to 24 K1 enclosures. It can be flown using single pick-point and secured to an additional safety point. It is assembled with bolts for mechanical integrity visual check and is protected by polyester-coating to enhance weather resistance.

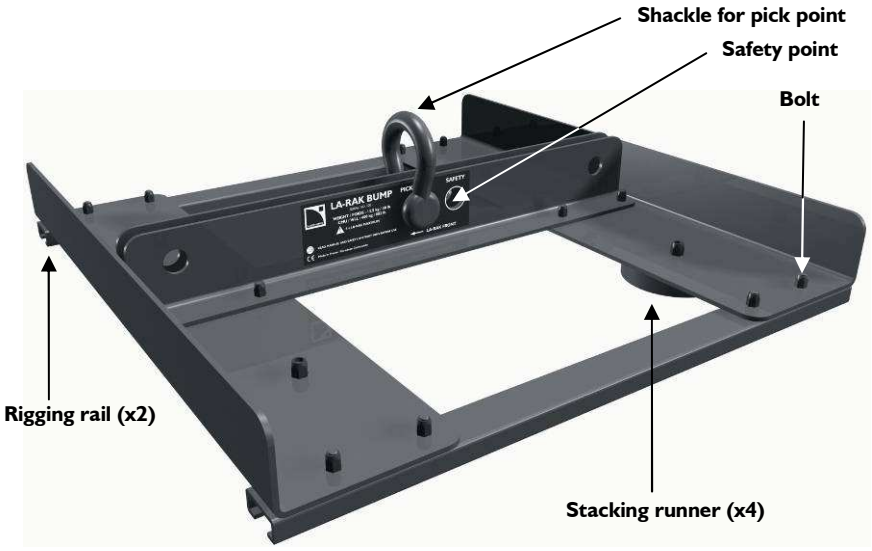


Figure 13: The LA-RAK BUMP

WARNING

All along the procedure:

- Strictly follow the sequence of the successive steps.
- Systematically ensure that each spring-loaded safety is in locking position and that screw pin is correctly secured on each shackle anchor.

1. Bring a first LA-RAK under the rigging point.

2. Remove both coupling bars:

a. Turn a spring-loaded safety and slide the coupling bar out.

b. Repeat for the second coupling bar.

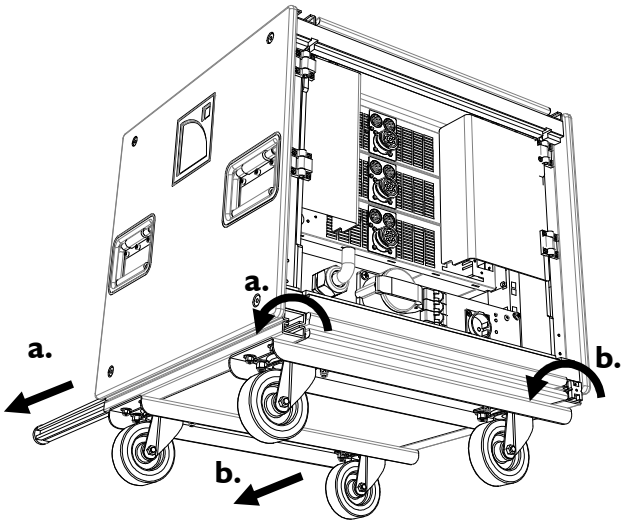


Figure 14: Removing coupling bars from LA-RAK

3. Install the LA-RAK BUMP on the LA-RAK: align the rails and set the stacking runners into the runner guides.

> WARNING
> Respect the orientation indicated beside the LA-RAK FRONT label.

4. Secure the LA-RAK BUMP to the LA-RAK (use both preceding coupling bars):

a. Turn a spring-loaded safety and slide in the coupling bar along the rails until the safety has returned to locking position (a click is heard).

b. Repeat for the second coupling bar.

5. Attach the motor hook to the "PICK POINT" shackle.

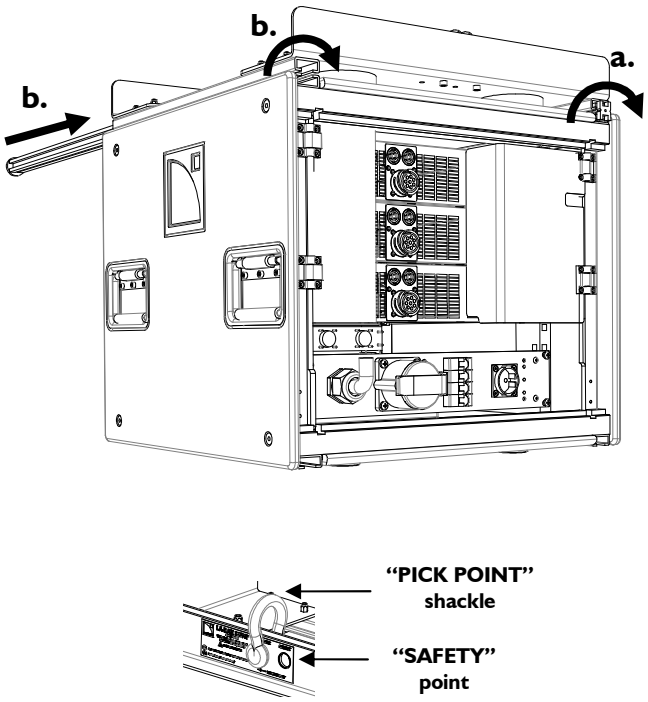


Figure 15: Attaching LA-RAK BUMP to LA-RAK

6. Raise the LA-RAK BUMP/LA-RAK assembly at 0.7 m/2 ft height: the dolly board should separate from the array.

7. Bring a second LA-RAK under the rigging point.

8. Remove both coupling bars by repeating step 2.

9. Lower the first LA-RAK so as to set it on the second one: align the rails and set the stacking runners into the runner guides.

10. Secure the first LA-RAK to the second one (use both preceding coupling bars):

a. Turn a spring-loaded safety and slide the coupling bar in along the rails until the safety has returned to locking position (a click should be heard).

b. Repeat for the second coupling bar.

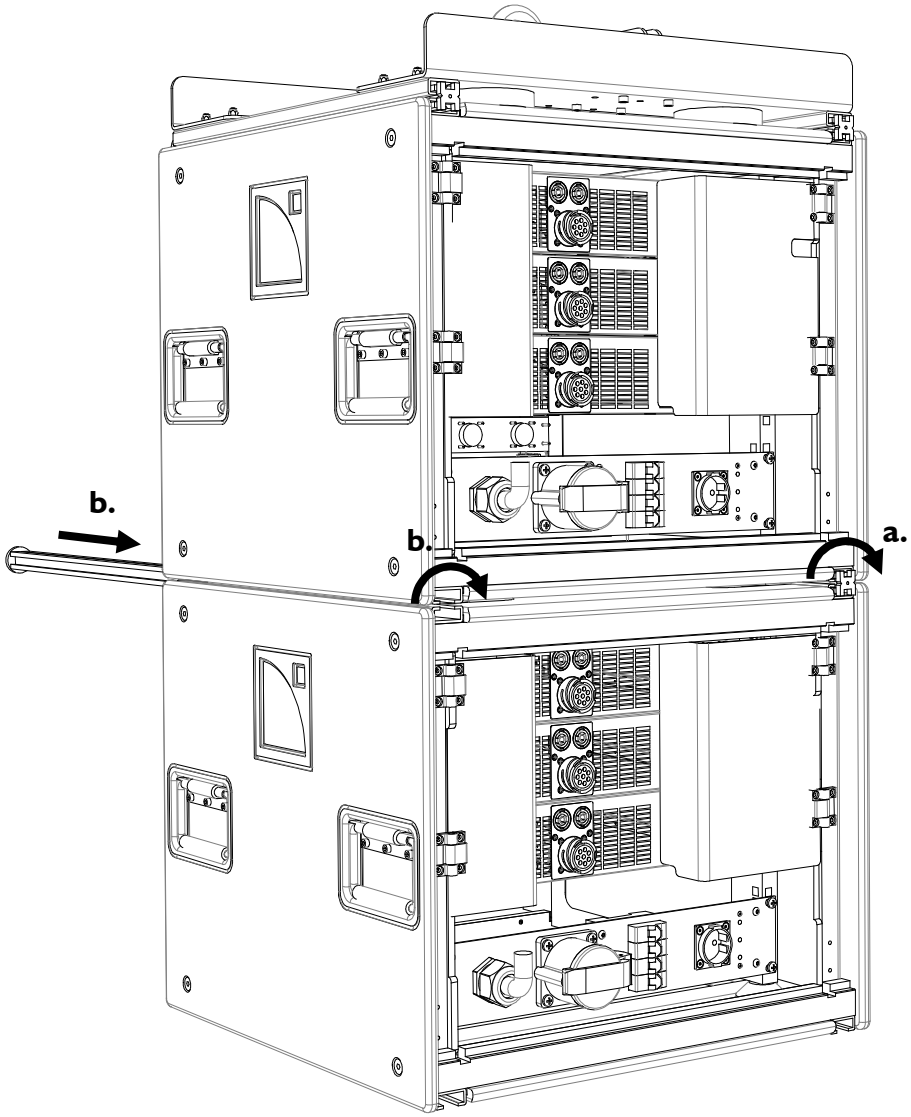


Figure 16: Securing the first LA-RAK to the second one (motor chain not represented)

11. Repeat steps from 6 to 10 for each remaining LA-RAK.

WARNING

A maximum of **four LA-RAK** can be flown under **one LA-RAK BUMP**.

12. Raise the LA-RAK array at desired height.

WARNING

Secure the LA-RAK flown array to the main structure using the SAFETY shackle (see Figure 15) and a sling.

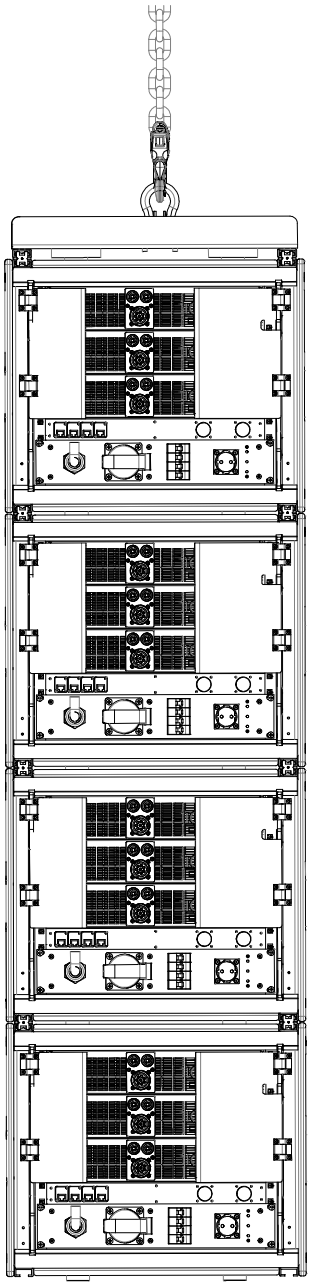


Figure 17: Four flown LA-RAK (maximum configuration)

6.4.3 Flying procedure using the K1-BUMP

Please refer to the **K1 Rigging Procedures** manual [3.4].

6.5 Connecting LA-RAK to AC mains

6.5.1 LA-POWER three-phase circuit

The LA-POWER connects to **230 V (±10 %)** / **32 A three-phase AC mains** using the male IN cable plug (P17 - 32 A - 3P+N+G).

VOLTAGE

The LA-POWER only connects to three-phase AC mains rated 230 V (±10 %) / 32 A, 50 - 60 Hz.
Contact a local L-ACOUSTICS® distributor for countries in which this standard does not apply.

A second LA-RAK can be plugged in the female LINK OUT outlet of the first LA-RAK to be powered in parallel.

CAUTION

Powering **two LA-RAK in parallel** is only possible in the 230 V (±10 %) countries.
In this case a maximum of **two LA-RAK** can be powered in parallel by one AC mains outlet.
For any other mains ratings, **a maximum of one LA-RAK** can be connected per AC mains outlet.

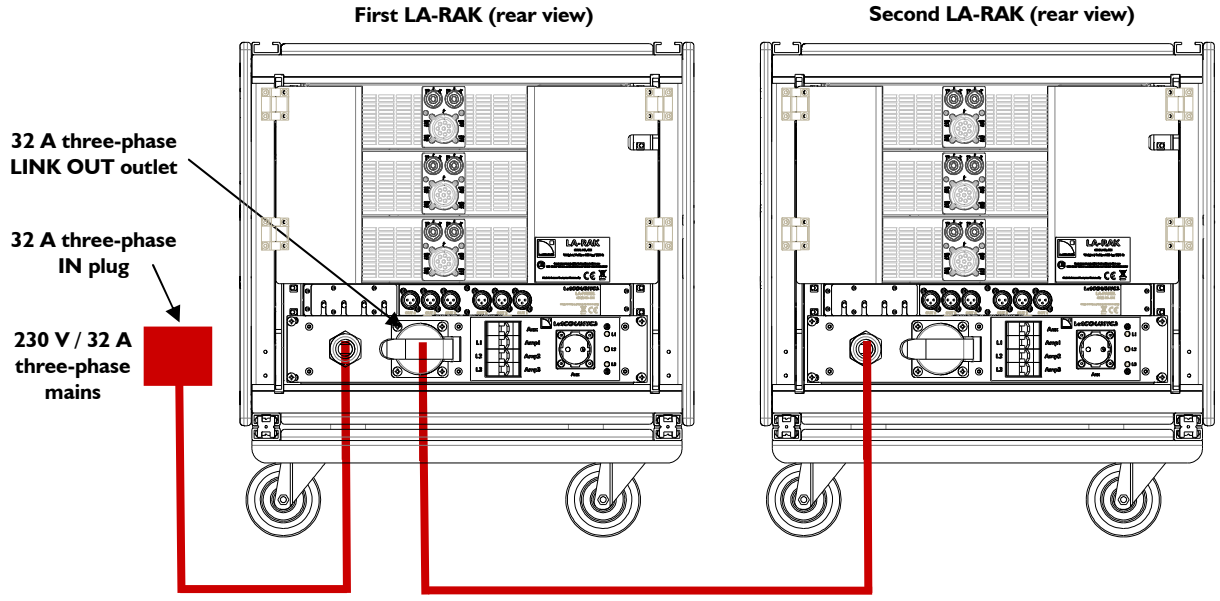
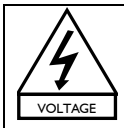


Figure 18: Parallel connection of two 230 V LA-RAK to AC mains

6.5.2 LA-POWER mono-phase circuits



Connect LA-RAK to AC mains **only if** the operating voltage indicated on the LA8 back panels corresponds to the local AC mains rating.

Two LA8 versions are available (also refer to the **LA8 User Manual** [3.4]):

- A universal 120/230 V (±10 %) version fitted with automatic switch mode power supply.
- A specific 100 V (±10 %) version for Japan.

The LA-POWER three-phase circuit described in section [6.5.1] powers the three mono-phase circuits corresponding to the **L1**, **L2**, and **L3 "**Shuko" female outlets located on the rear face. These last allow connection of the three LA8 amplified controllers mounted in the LA-RAK (see Figure 19).

Each outlet is protected by a **16 A type C** circuit breaker located on the front face and three LED help monitor the presence of each phase on the front end of the mains circuit.

The LA-POWER also includes an **auxiliary circuit** protected by the "Aux" **10 A** circuit breaker, shunted from phase 1. This circuit powers one "Shuko" outlet located on the front face (to connect portable computer and the like) and two IEC CEE22 outlets located on the rear face (to connect additional Ethernet® switches).

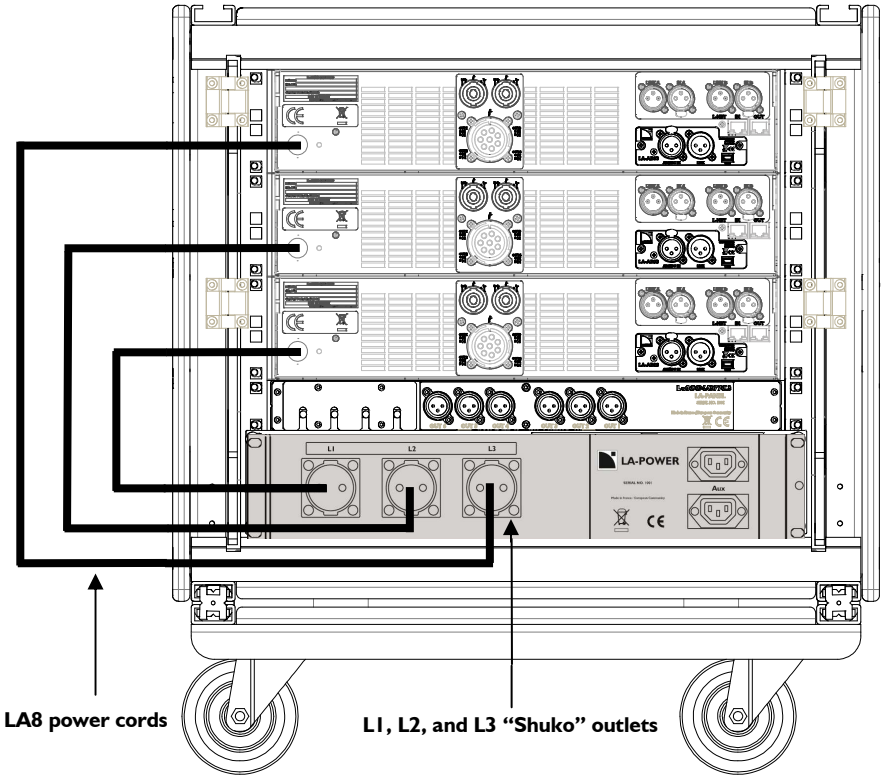


Figure 19: Powering three LA8 within an LA-RAK (LA-POWER rear panel represented)

6.6 Analog audio cabling

6.6.1 Internal cabling

With analog audio, routing modularity is achieved through internal cabling, whereas external cabling uses a constant scheme (see [6.6.2]).

An **XLR connection panel** located on the rear side of the LA-PANEL and a set of **six XLR cables** allow distributing up to six different analog audio signals to the LA8 amplified controllers. As the possible internal audio cabling schemes are numerous only two representative ones are shown in Figure 20:

a. One audio signal routed from channel #1 to the analog IN A on the first amplifier.
LINK A / IN A cabling is then used to cascade all three LA8.

Note: In this example, only the A channel is physically linked on each LA8 and only the A channel can further be routed to all four output channels on each LA8. Use the LA NETWORK MANAGER Matrix function as described in the **LA NETWORK MANAGER User Manual** [3.4].

b. Six audio signals respectively routed from channels #1-6 to the six controller analog inputs. In this case only the INPUT connectors are used on the amplifiers.

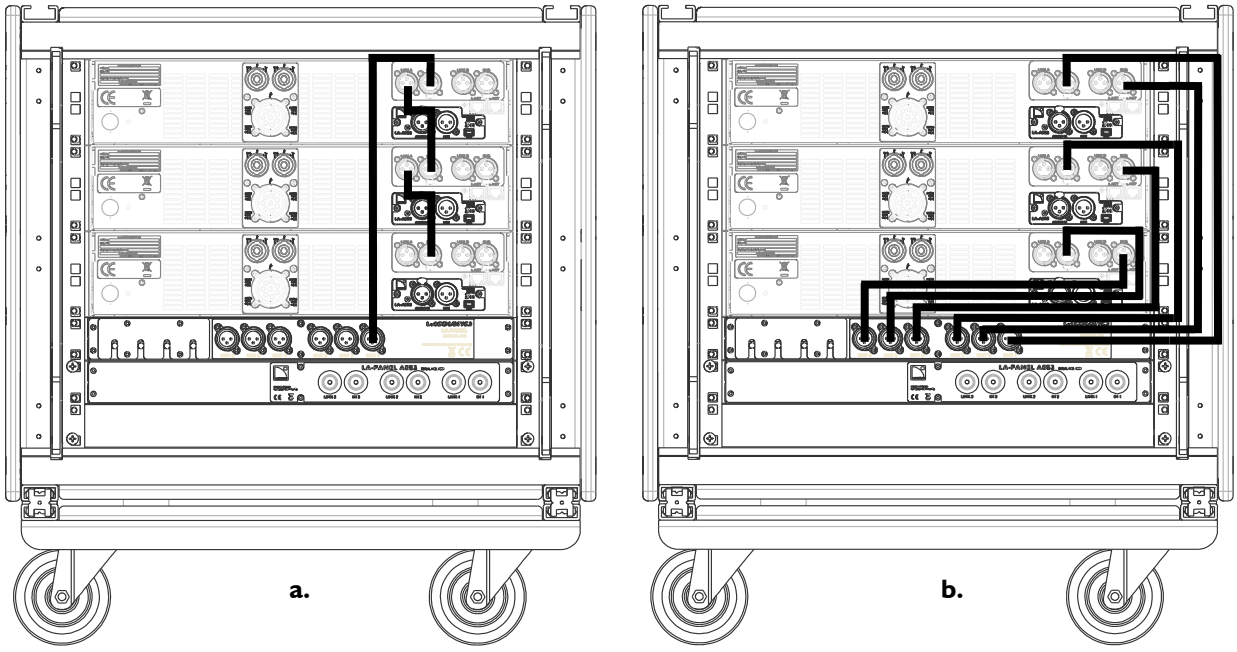


Figure 20: Internal analog audio cabling for (a) 1 or (b) 6 input signals (LA-POWER not represented)

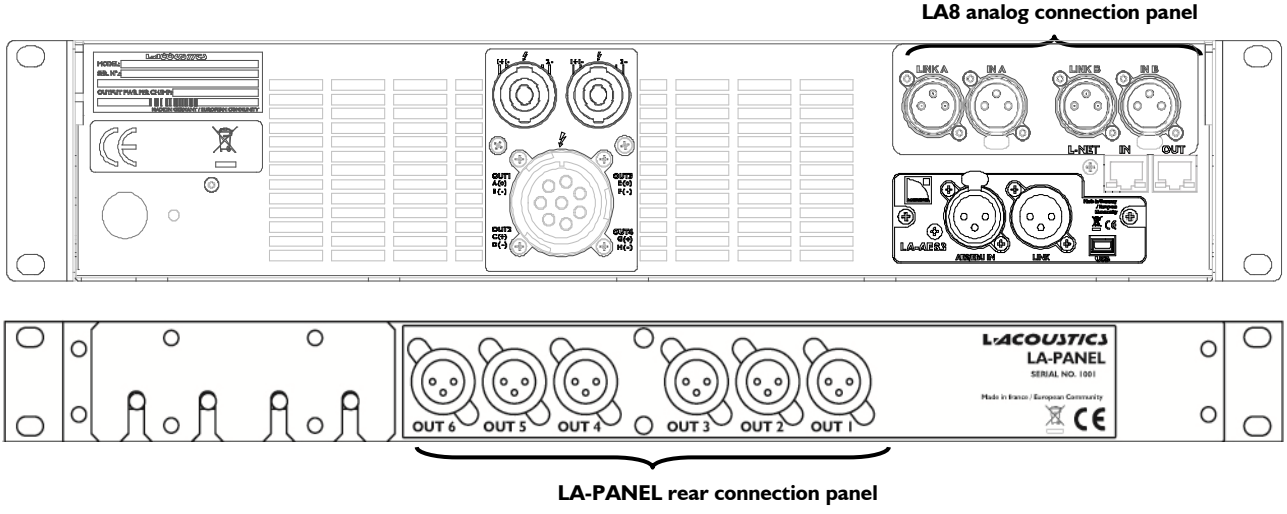


Figure 21: Analog audio connection panels on LA8 and LA-PANEL (rear views)

6.6.2 External cabling

With analog audio, external cabling uses a constant scheme that allows feeding a LA-RAK, or a LA-RAK daisy-chain, with up to 6 signals. For any LA-RAK, the internal cabling (see [6.6.1]) determines how many channels are used, which ones, and which amplifier receives them.

With L-ACOUSTICS® modulation cables (see Table 2), six audio signals can be routed from an analog audio source (mixing console or EQ device) to the SIGNAL INPUT connector (19-point PA-COM®) on the LA-PANEL of a first LA-RAK.

An LA-RAK daisy-chain layout can then be set up by cabling the SIGNAL OUTPUT connector of the LA-PANEL with the SIGNAL INPUT connector located on the LA-PANEL of another LA-RAK.

The six analog audio signals can also be routed from the last LA-RAK to other signal processing devices using the DOMM cable.

Cascading several LA-RAK cause losses in the analog signal. The losses increase in line with the number of LA-RAK and the console output impedance. Typically, cascading 16 LA-RAK will cause a -1 dB loss with a 50 Ω console and a -3 dB loss with a 150 Ω console.

Table 2: L-ACOUSTICS® modulation cables

Cable reference	Input connector(s)	Output connector(s)	Length (m / ft)
DOMF	6 x balanced female XLR	19-point female PA-COM® with ring	1.5 / 5
DOMM	19- point female PA-COM® with ring	6 x balanced male XLR	1.5 / 5
DOM2	19- point female PA-COM® with ring	19- point female PA-COM® with ring	2 / 6.5
DOM30	19- point female PA-COM® with ring	19- point female PA-COM® with ring	30 / 100
DOM45	19- point female PA-COM® with ring	19- point female PA-COM® with ring	45 / 150
DOMP-2	19- point male PA-COM®	19- point male PA-COM®	0.5 / 1.5

Figure 22: L-ACOUSTICS® modulation cables

The Figure 23 shows the external analog audio cabling principle including all available L-ACOUSTICS® modulation cables.

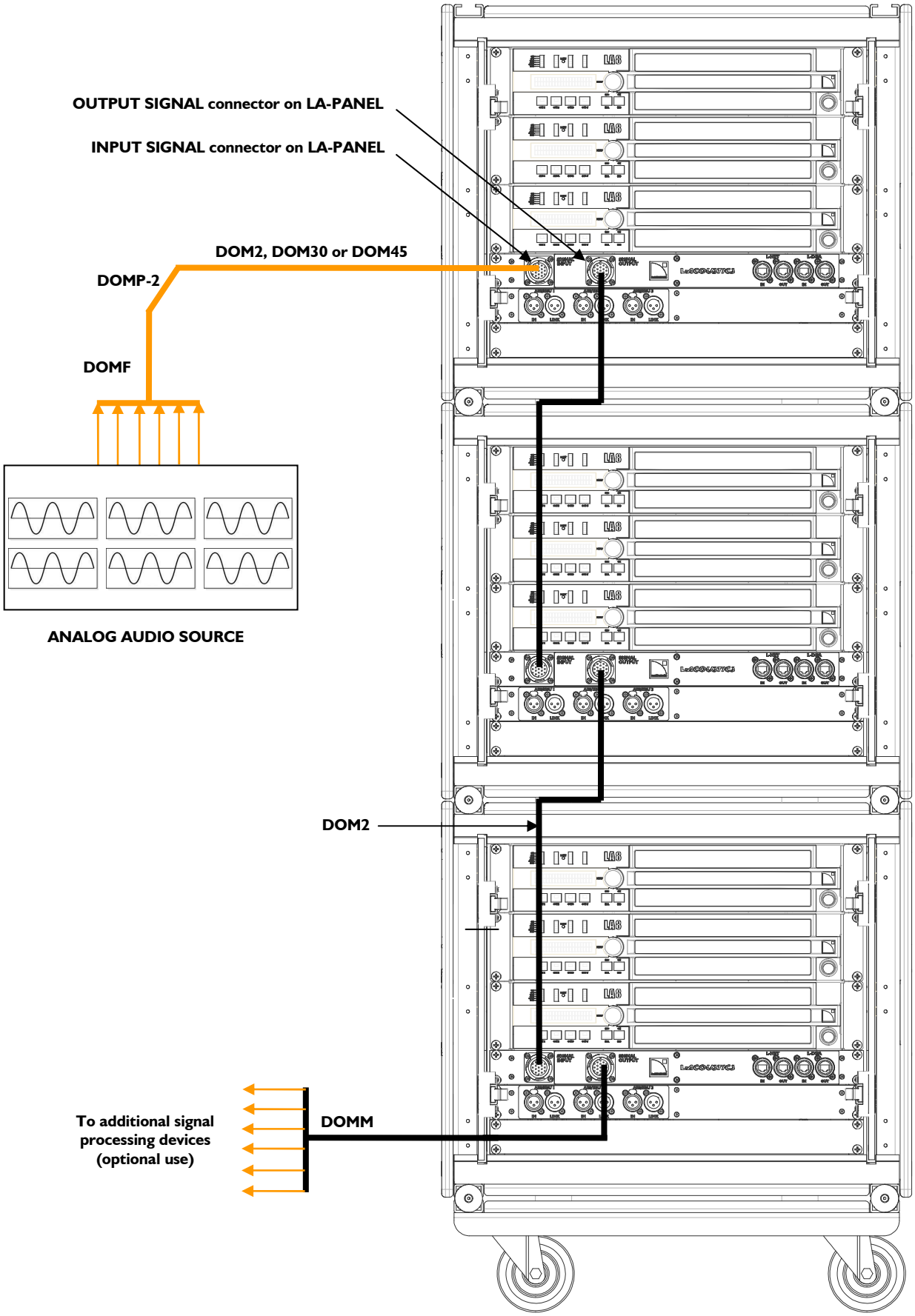


Figure 23: Feeding three LA-RAKs with 6 analog audio signals

6.7 Digital audio cabling

6.7.1 Internal cabling

With digital audio, internal cabling uses a constant scheme. As digital audio requires an active refresh of the signal that is provided by the LA-AES3 card, routing modularity is achieved through external cabling [6.7.2]. The only internal cabling scheme that should be used is shown in Figure 24.

The XLR3 cables (IN/LINK) at the back of the LA-PANEL AES3 allow distributing up to six different digital audio signals. Each IN connector of the front patch panel of the LA-PANEL AES3 is cabled to the AES/EBU IN connector on the respective LA8, using the appropriate IN XLR cable..

Each AES/EBU LINK connector on the amplifiers is then cabled to the respective LINK connector of the LA-PANEL AES3 using the appropriate LINK XLR cable.

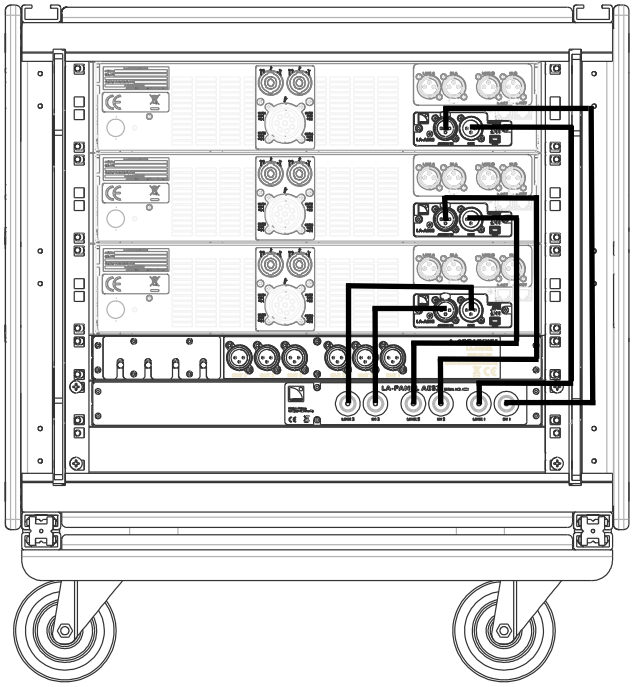


Figure 24: Internal digital audio cabling (LA-POWER not represented)

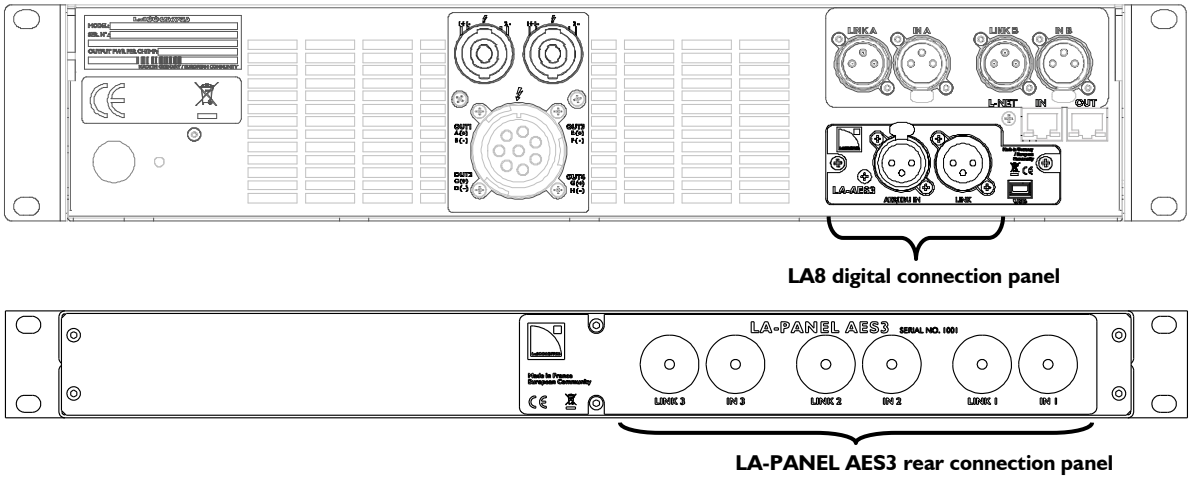


Figure 25: Digital audio connection panels on LA-PANEL and LA8 (rear views)

6.7.2 External cabling

With digital audio, routing of the signals is achieved in a convenient and flexible manner through external cabling, by using the patch panel on the front of the LA-PANEL AES3. Two examples are given in Figure 26 and Figure 27.

Up to six digital audio signals can be routed from an AES/EBU digital audio source (mixing console or EQ device) to the LA-PANEL AES3 via three XLR3 cables, each one conveying two channels.

Provided the internal cabling is correct (see [6.7.1]), each pair of signals can be routed in a daisy-chain layout, by cabling the corresponding LINK connector of the LA-PANEL AES3 to another IN connector of the same LA-PANEL AES3 (for internal daisy-chaining), or to an IN connector of another LA-PANEL AES3 (for external daisy-chaining). It allows modular routing layouts.

Here is important information about **cables for AES/EBU digital audio**:

- The quality required for the XLR cables will depend on the cable length and the signal sampling frequency. As a starting point, a standard balanced microphone cable of maximum length of 50 m/150 ft can be used to transport a signal of maximum sampling frequency of 48 kHz. Higher sampling frequencies may require reducing the cable length since the signal attenuation in cables increases with the sampling frequency.
- As AES/EBU certified cables provide smaller attenuation/length ratio, it is highly recommended to use them in installations requiring long cable runs or high sampling frequency signals.
- The LA-AES3 has been tested with **up to 305 m/1000 ft** of 3 models of AES/EBU rated cables: Belden® 1696A, Klotz Cables® OT234H, and Sommer Cable® SC BINARY 234 (single cuts, digital source signal running at Fs = 48 kHz).
- Using several cuts of cables will decrease performances.
- In case an amplified controller shutdowns, the failsafe relay makes a passive connection between the AES/EBU IN port and the LINK port to maintain continuity. However the signal is no longer refreshed for the next amplified controller, so that the input cable and the link cable must be considered as a unique input cable with regard to the maximum supported length.
- In case of transmission losses, try to reduce the sampling frequency of the digital audio source. Moreover, as a general rule, avoid using sources rated beyond 96 kHz as the maximum possible cable length will be reduced while the additional information will anyway be cancelled by SRC to 96 kHz.

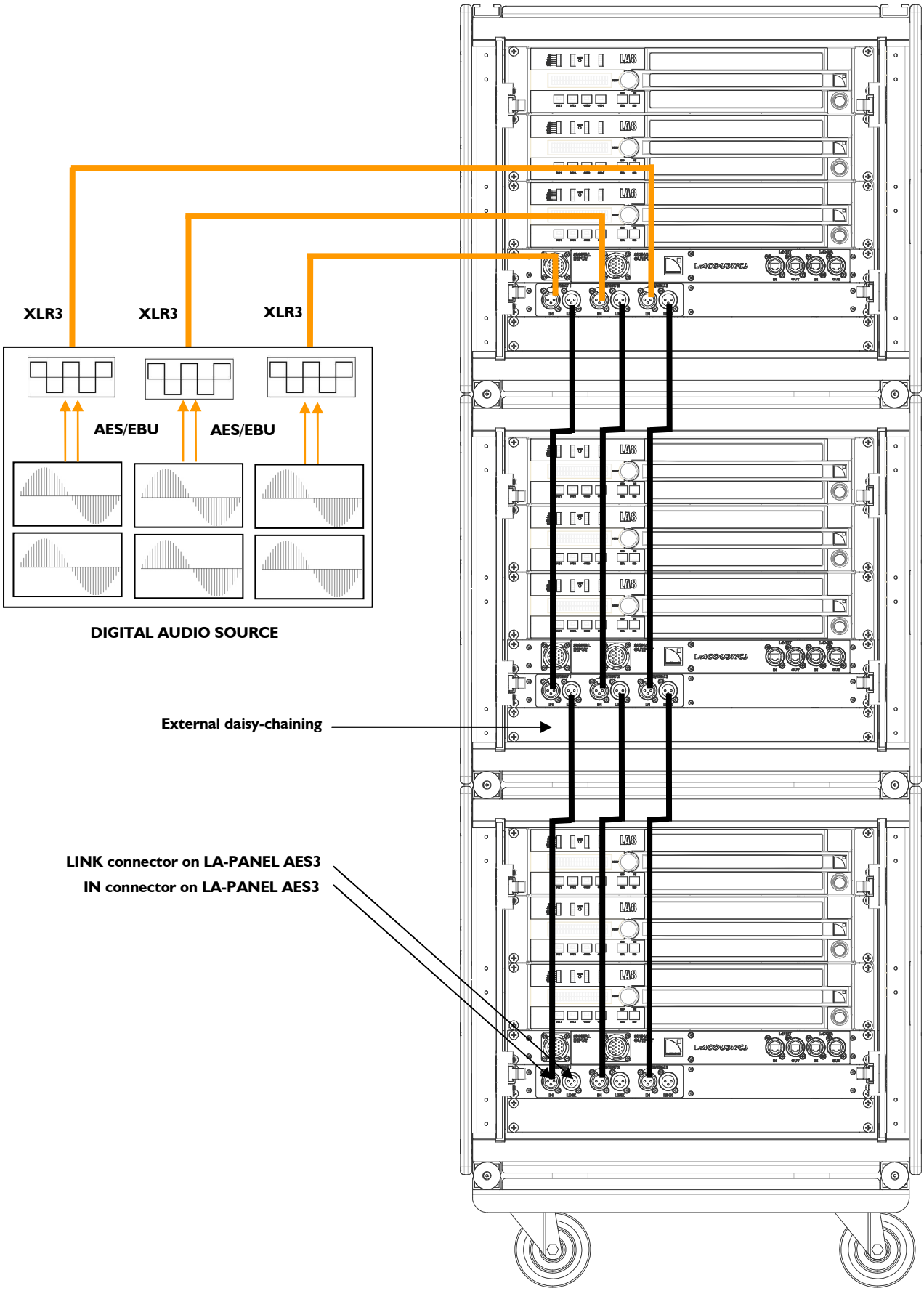


Figure 26: Feeding three LA-RAK with three pairs of digital audio signals

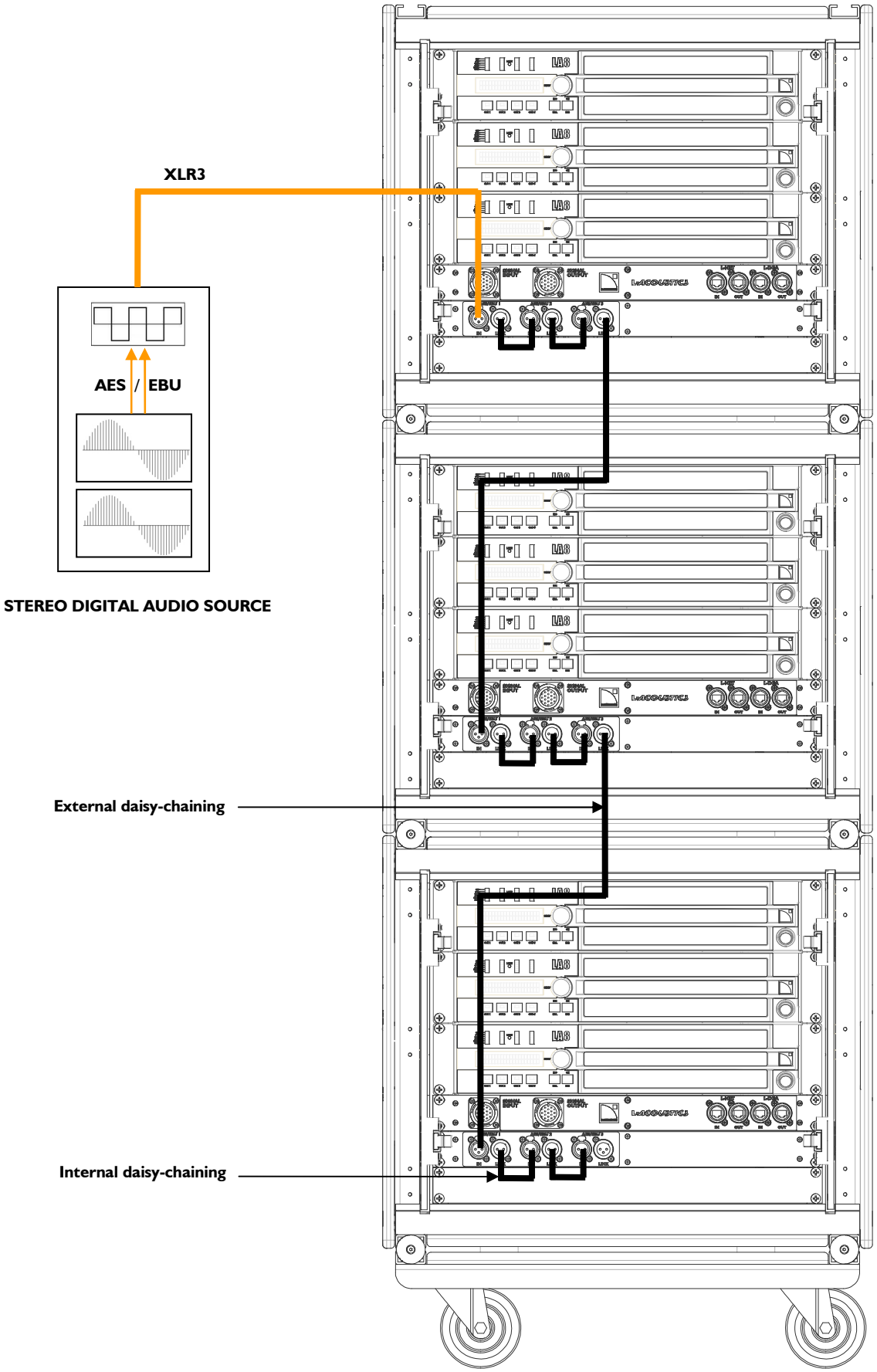


Figure 27: Digital audio cabling with LA-RAK – FOH example

6.8 Loudspeaker cabling

The rear side of the LA-RAK gives access to the output connection panel of each LA8. For each amplifier, this panel feature one CA-COM® connector, as well as three SpeakON® connectors.

IMPORTANT

Please refer to the appropriate **enclosure User Manual** as well as **LA8 User Manual** [3.4] to connect any L-ACOUSTICS® enclosure to the LA-RAK.

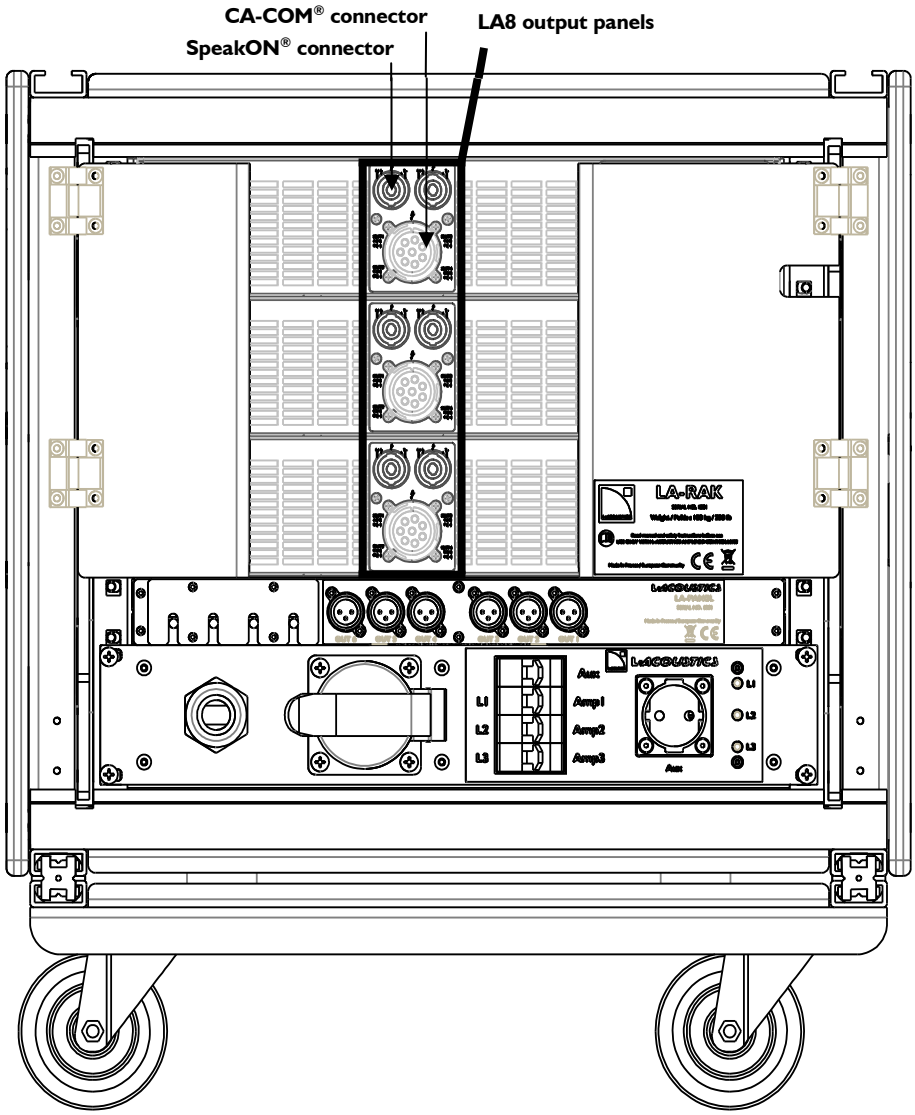


Figure 28: LA-RAK speaker connectors

IMPORTANT

The 8-point **CA-COM®** connector on the LA8 is fully compatible with all 8-point L-ACOUSTICS **PA-COM®** cables **EXCEPT** for the DO2W, DOFILL and DOSUB cables.
Refer to **LA8 PACOM CABLES Technical bulletin** [3.4] for more details

6.9 L-NET network cabling

6.9.1 L-NET network overview

L-NET network is for transferring data to and from LA NETWORK MANAGER software (see the **LA NETWORK MANAGER User Manual** [3.4]). It allows remote control and monitoring of a network of amplified controllers.
By using LA-PANEL, various digital network topologies such as daisy-chain, star, and hybrid are quickly and easily configurable, allowing total flexibility in achieving the required system architecture. The star and hybrid network topologies require the addition of a universal Ethernet® switch.

Note: The more reliable digital cabling scheme is the external star/internal star one.

IMPORTANT

- To cable L-NET network, use CAT5e U/FTP cables (or higher category) fitted with RJ45 connectors.
- The length of each network cable must not exceed 100 m/328 ft.
- Only connect network devices featuring a minimum speed of 100 Mbps.

6.9.2 Internal cabling

LA-PANEL features four RJ45 I/O sockets. When leaving the factory the LA-PANEL also features four CAT5e U/FTP cables already installed. If cables replacement is needed follow the procedure described in [7.3].

The cable linked to the IN connector on the back of LA-PANEL allows network connection for all three LA8, following two potential cabling schemes, illustrated in Figure 30:
- either by connecting a first LA8 via its L-NET IN connector, and routing the network towards another LA8 via the L-NET OUT connector, for a daisy-chain topology;
- or by connecting the cable to a switch (not provided), which will feed all three LA8, for a star topology.

The cable linked to the OUT connector on the back of LA-PANEL allows getting back the network signal from the L-NET OUT connector of a LA8, to send it towards another LA-RAK and set up an external daisy-chain topology.

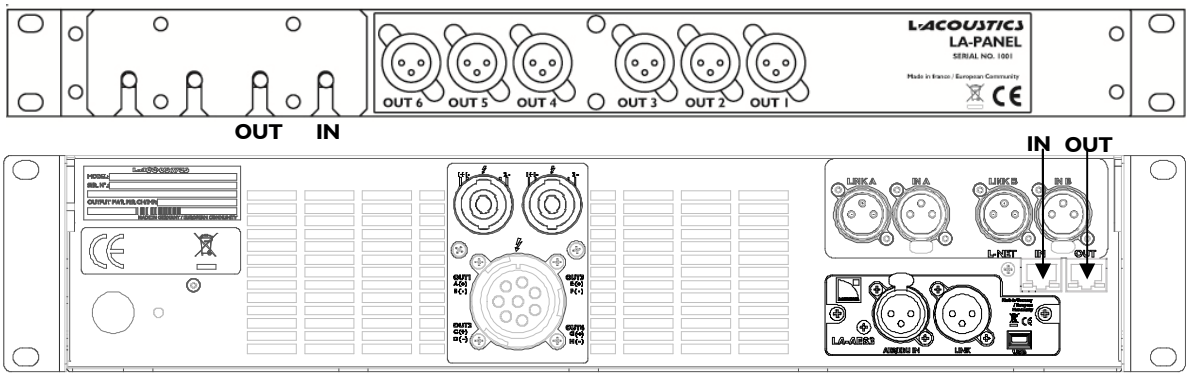


Figure 29: L-NET network connection panels on LA-PANEL and LA8 (rear views)

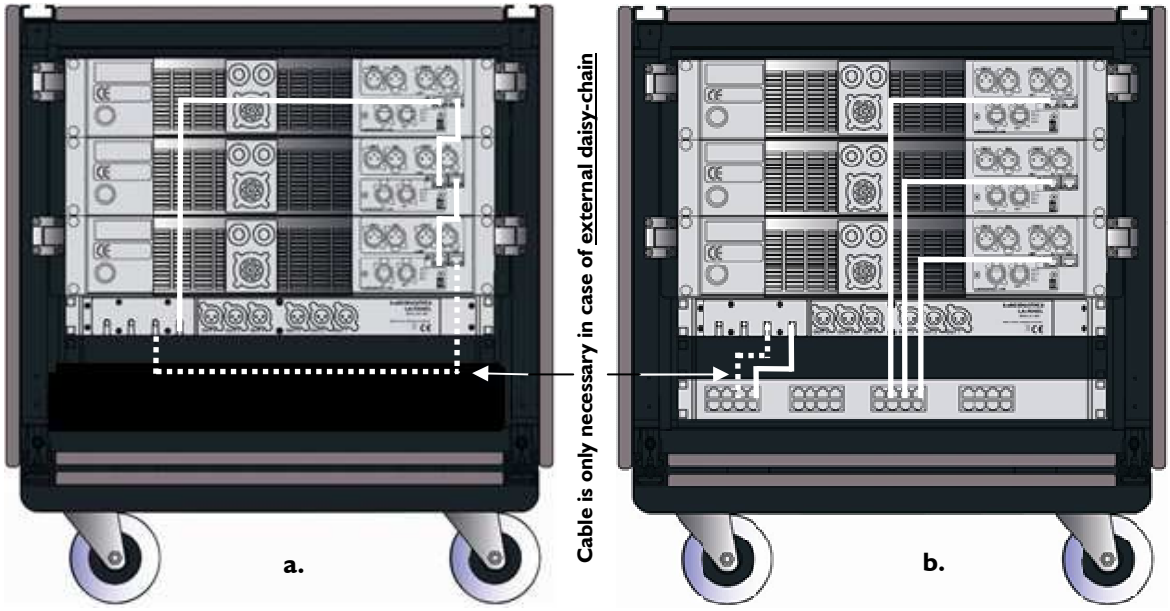


Figure 30: L-NET internal cabling for (a) daisy-chain or (b) star network topologies

6.9.3 External cabling

The LA-PANEL front side features two Ethercon® I/O sockets, for external L-NET network cabling (see Figure 31).

IMPORTANT

A maximum of 253 LA8 can be interconnected within the same network (84 LA-RAK + 1 LA8).

Figure 31: LA-PANEL front view

To set up an L-NET network with several LA-RAK, three cabling schemes can be used, as illustrated in Figure 32, Figure 33 and Figure 34:

- Daisy-chain: The IN connector of a first LA-RAK is linked to the computer driving LA NETWORK MANAGER. The network is then set up by linking the OUT connector of each LA-RAK to the IN connector of the following LA-RAK in the chain.
- Star: The computer driving LA NETWORK MANAGER is connected to a switch (not provided), which is directly linked to each of the LA-RAKs via their IN connector.
- Hybrid: Both topologies are jointly used: the star topology to distribute the network to several LA-RAKs and then the daisy-chain topology to serially cable other LA-RAKs with each of the first LA-RAKs.

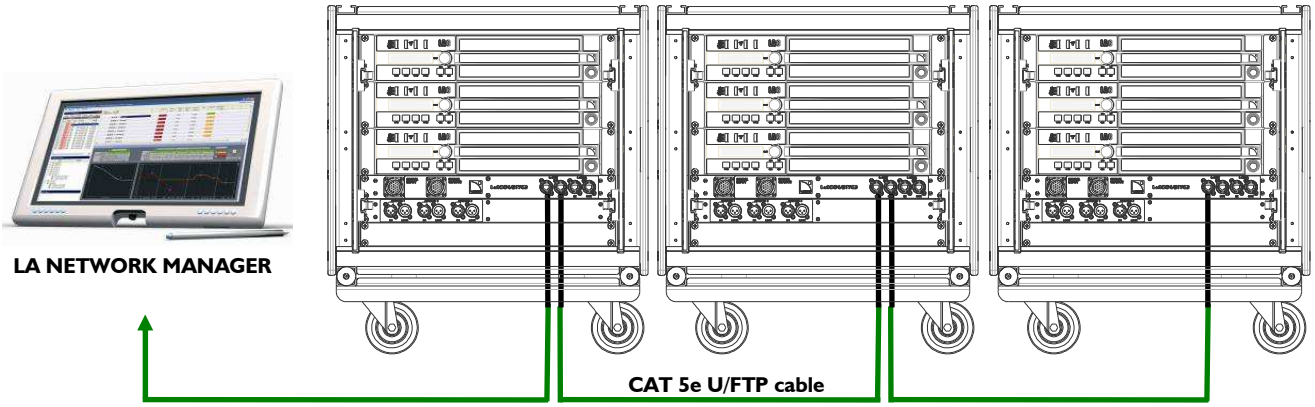


Figure 32: L-NET external cabling – option 1: daisy-chain topology

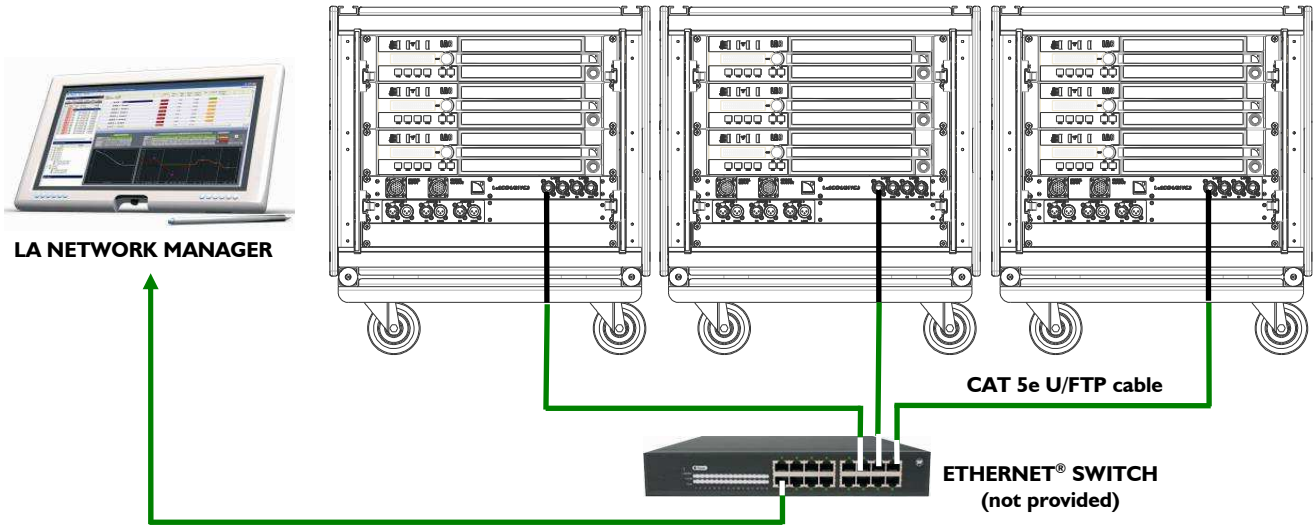


Figure 33: L-NET external cabling – option 2: star topology

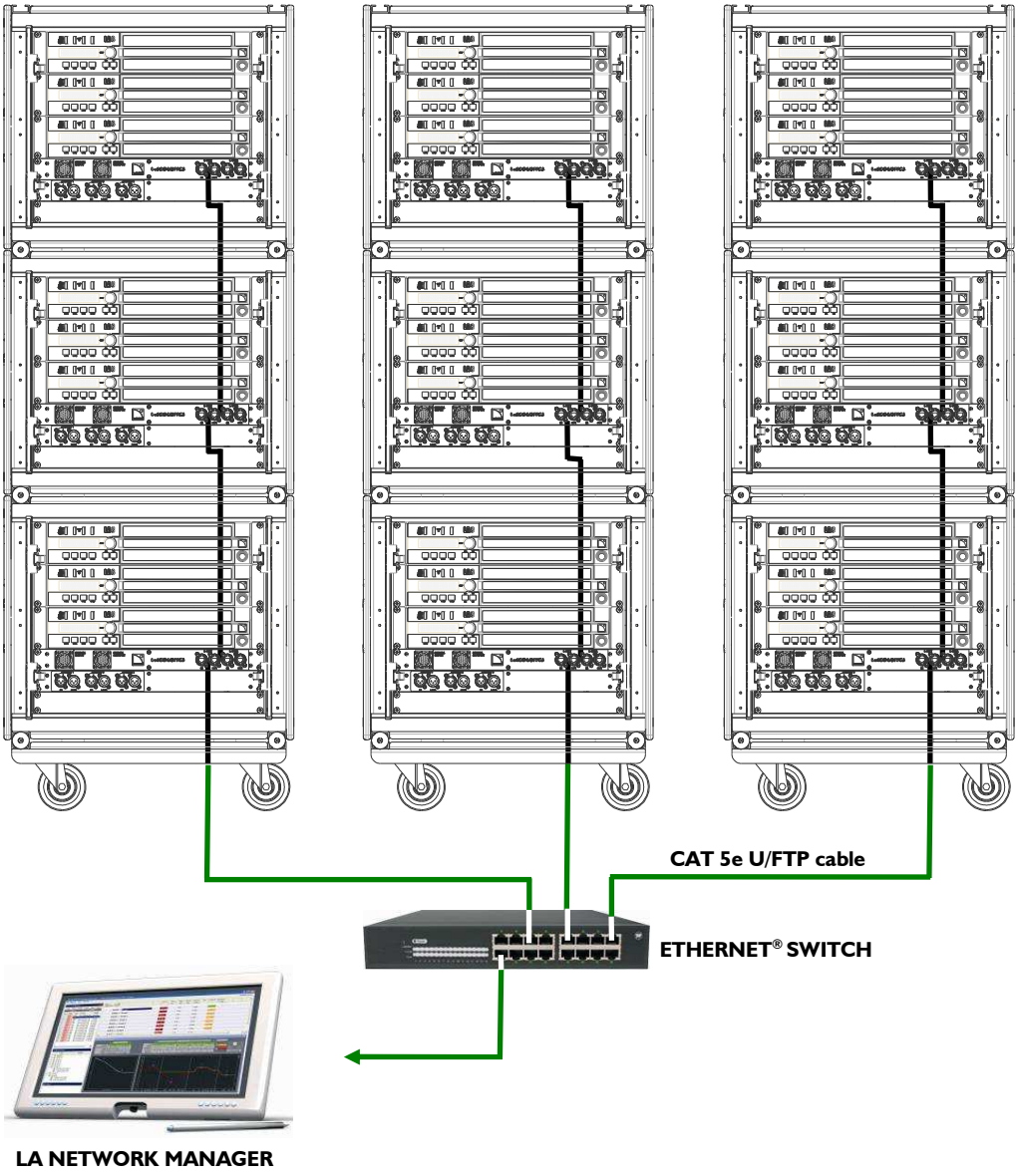


Figure 34: L-NET external cabling – option 3: hybrid topology

7 CARE AND MAINTENANCE

7.1 Maintenance information

The **L-ACOUSTICS® LA-RAK Touring Rack** is a technical product designed for various, intensive indoor and outdoor sound reinforcement applications. To fulfill such demanding conditions L-ACOUSTICS® has designed the LA-RAK with high-grade and reliable components:

- Aluminum and steel frames, rubber shock mounts.
- Polyethylene sides.
- LEXAN® polycarbonate doors.
- Screws and rigging points resistant to oxidation.

However, in order to ensure product performance and safety, it is essential to frequently inspect the LA-RAK and its internal components. These checks need to be done on a regular basis depending on the conditions of system use and are described in section [7.2].
In addition, it is possible to replace the network cables located at the back of the LA-PANEL. Procedure is described in section [7.3].
Spare parts and recommended tools are detailed in section [7.4].

7.2 Checking procedures

7.2.1 Check of internal components

Check the LA8 controllers as described in the **Care and maintenance** section of the **LA8 User Manual** [3.4].

Check the contact quality and the locking action of all sockets (PA-COM®, CA-COM®, SpeakON®, XLR, Ethercon®, RJ45, as well as power plug and sockets) on the LA8, LA-POWER, LA-PANEL and LA-PANEL AES3.

If necessary, contact an L-ACOUSTICS® authorized representative to replace the damaged components.

7.2.2 Mechanical assembly and rigging parts inspection

The assembly and rigging parts of the LA-RAK system are:

- RK 9U internal frames and electric/electronic devices fixed on them, as well as screws and washers.
- RK 9U rigging rails, ball locking pins, rear panels, and LEXAN® doors.
- Dolly board and coupling bars with spring-loaded safeties.
- LA-RAK BUMP including shackles.

The inspection procedure is as follows:

1. Inspect the general aspect of the assembly and rigging parts described above.
2. Check the integrity of mobile and rigging parts (no signs of deformation, indents, or rust).
3. Ensure that the locking mechanism of each spring-loaded safety, ball locking pin, and shackle operates normally.

Any component incorporating a part showing signs of defect must immediately be put aside and withdrawn from use to be inspected by qualified service personnel.

7.3 Network cables replacement procedure

When leaving the factory the LA-PANEL features four CAT5e U/FTP cables. If cables replacement is needed follow the procedure below:

a. Remove the LA-PANEL from the LA-RAK by removing the four front Pozidriv® screws.

b. Unscrew the back protecting plate by removing the four Torx® screws.

c. Remove the old cables and install new ones.

CAUTION

Check that the connector bodies of the new cables are short enough to allow putting the plate back in place.

d. Put the plate and Torx® screws back in place (torque to 1.5 N.m/14 in.lb_f).

e. Put the LA-PANEL and Pozidriv® screws back in place into the LA-RAK (torque to 3 N.m/27 in.lb_f).

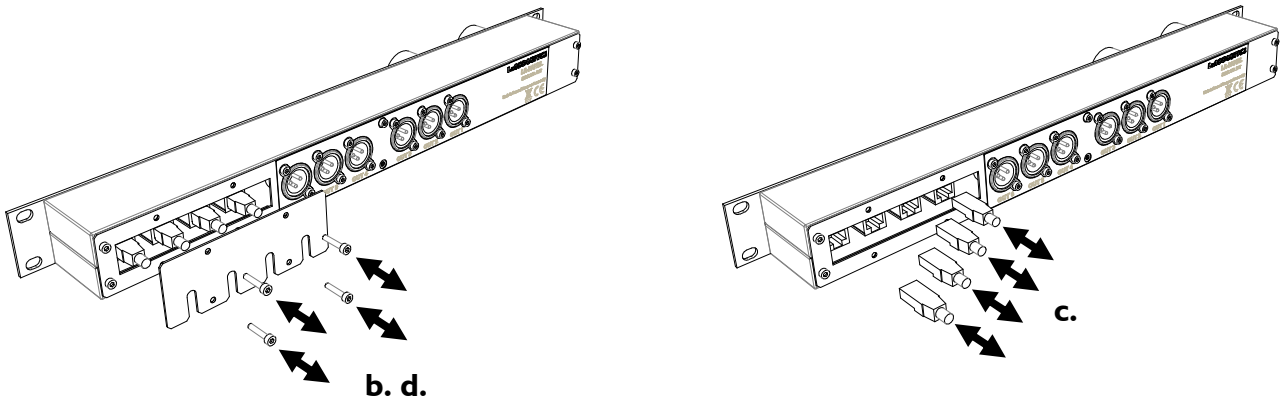


Figure 35: Replacing network cables on the LA-PANEL rear side

7.4 Spare parts and recommended tools

Table 3: Available spare parts

RK9U	Rack structure with dolly board and 2 coupling bars
SE PLARK9U	Dolly board
SE RIGRK9U	2 Coupling bars
MP RK9UPORTE	LEXAN® door
CA RKLOC	LEXAN® door latch
CA RK9UCACHE	1U blank panel
RKENTR	Spacer to fix the LA8 rear part to the LA-RAK
LA8/LA8 US/LA8 JP	Amplified controller 4x1800 W @ 4 Ω for EU/USA/ Japan
LAPANEL	Analog signal and network distribution panel
LAPANELAES3	Digital signal distribution panel
SE CHPRK9U10	1 m/3 ft XLR cable
SE CHPRK9U03	0.35 m/1 ft XLR cable
CP RK9UETH1	1 m/3 ft CAT5e U/FTP cable
CP RK9UETH2	0.3 m/1 ft CAT5e U/FTP cable
LAPOWER	LA-POWER power distribution panel
LARAKBUMP	LA-RAK BUMP rigging frame
CA MAN19L	⅝" shackle

Table 4: Recommended tools for service

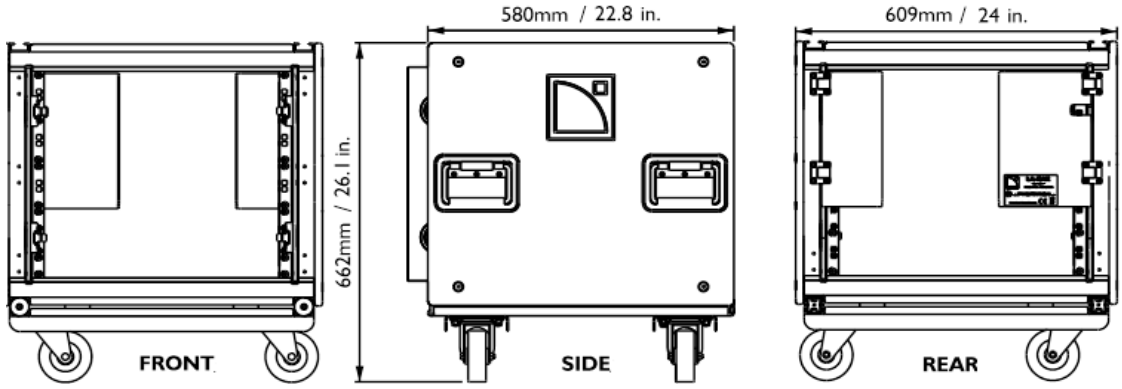
Torque wrench (N.m or in.lb_f)
PZ.3 Pozidriv® screwdriver
T10 Torx® screwdriver

IMPORTANT

- In Europe use the LA-POWER device (230 V version) presented all along this manual.
- In USA use the LA-POWER US device (120 V version) presented in Appendix [9].
- In any other country contact a local L-ACOUSTICS® distributor.

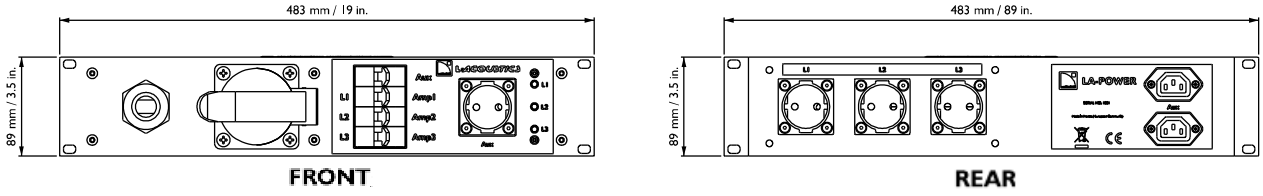
8 SPECIFICATIONS

Reference	**RK 9U**
Dimensions (W x H x D)	609 x 513 x 580 mm / 25 x 20.2 x 22.8 in
H including dolly board	663 mm / 26.1 in



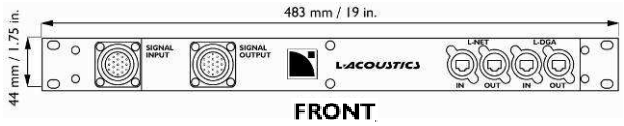
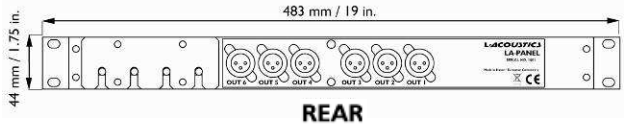
Weight	51,4 kg / 113 lbs with dolly board (96,5 kg / 212 lbs when fully equipped)	
Setup safety limits of captive rigging components	Vertical flying	Certified for up to 4 LA-RAK underneath the L-ACOUSTICS® LA-RAK BUMP flying frame (available separately). Certified for up to 4 LA-RAK onto the L-ACOUSTICS® K1-BUMP flying frame (available with the K1 system, refer to the **K1 Rigging Procedures** manual [3.4]).
	Vertical stacking	Certified for up to 3 LA-RAK onto the dolly board.
	Moving & transporting	Certified for up to 2 LA-RAK onto the dolly board.
External Structure	Materials	Polyethylene, aluminum, and steel.
	Finish	Grayish-brown, RAL 8019®.
	Doors	LEXAN® polycarbonate.
	Rigging components	Polyester-coated steel.
	Handles	Integrated into the cabinet.
Complementary accessories	1 x dolly board, 2 x coupling bars.	

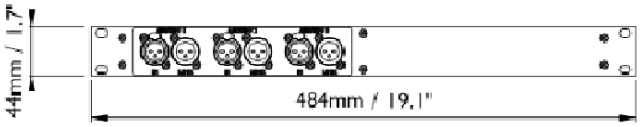
Reference	**LA-POWER** [1]
Dimensions (W x H x D)	483 x 89 (2U) x 103 mm / 19 x 3.5 (2U) x 4 in

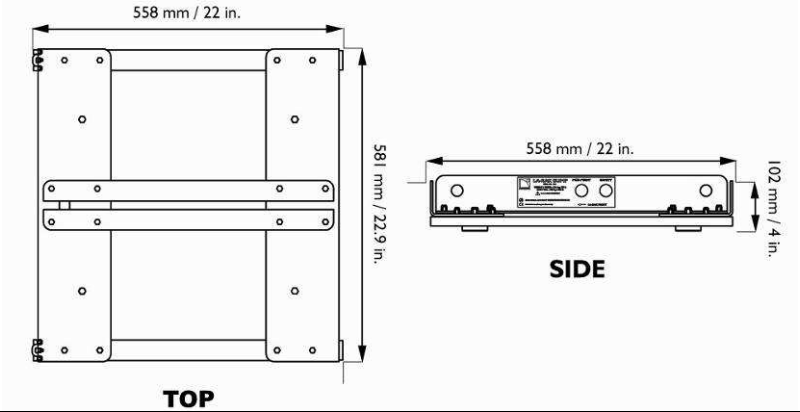


Weight	4 kg / 8.8 lbs	
Front connectors	AC input	32 A – P17 (3P+N+G) male plug + power cord.
	AC link out	32 A – P17 (3P+N+G) female outlet.
	AC auxiliary output	1 x type F "Shuko" outlet.
Rear connectors	AC outputs for controllers	3 x type F "Shuko" outlets (L1, L2, L3).
	AC auxiliary outputs	2 x type IEC CEE22 outlets.
Protection	3 x 16 A type C circuit breakers (L1, L2, L3). 1 x 10 A type C circuit breaker (Auxiliary).	

[1] European standard. See applicable documentation for other countries.

Reference	LA-PANEL	
Dimensions (W x H x D)	483 x 44 (1U) x 59 mm / 19 x 1.75 (1U) x 2.3 in	
	 FRONT	 REAR
Weigth		
Front connectors	INPUT/ LINK OUT L-NET I/O L-DGA I/O	2 x PACOM® 19-point sockets 2 x Ethercon® sockets 2 x Ethercon® sockets
Rear connectors	OUT1/ OUT2 /OUT3 /OUT4 /OUT5 / OUT6 L-NET I/O L-DGA I/O	6 x Neutrik® male XLR 3 sockets 2 x RJ45 sockets 2 x RJ45 sockets
Complementary accessories	6 x XLR 1 m/3 ft labeled cables, 2 x XLR 0.35 m/1 ft bridge cables 4 x CAT5e U/FTP 1 m/3 ft labeled cables 2 x CAT5e U/FTP 0.3 m/1 ft bridge cables Ethernet® switch (not provided, only for star network topology)	

Reference	LA-PANEL AES3	
Dimensions (H x W x D)	44 x 484 x 64.8 mm / 1.7 x 19.1 x 2.6 inch	
	 FRONT	REAR
Weight	1.5 kg / 3.3 lbs	
Front connectors	IN 1/ IN 2/ IN 3 LINK 1/ LINK 2/ LINK 3	3 x Neutrik® female XLR3 sockets 3 x Neutrik® male XLR3 sockets
Rear XLR cables	IN 1/ IN 2/ IN 3 LINK 1/ LINK 2/ LINK 3	3 x 1.15 m/3.8 ft male XLR3 cables 3 x 1.15 m/3.8 ft female XLR3 cables
Front finish	Polyester powder-coated steel	
Complementary accessories	2 x 0.55 m/1.8 ft male-female XLR3 link cables	

Reference	LA-RAK BUMP
Dimensions (W x H x D)	581 x 102 x 558 mm / 22.9 x 4 x 22 in
	
Weight	13.5 kg / 29.7 lbs
Setup safety limits	Maximum of 4 LA-RAK per LA-RAK BUMP.
Material	Polyester-coated steel.
Complementary accessories	2 x ⅝" shackles

Reference	LA8 amplified controller
Dimensions (W x H x D)	88,1 (2U) x 483 x 420 mm / 3.5 (2U) x 19 x 16.5 in **Weight** 12.3 kg / 26.9 lbs
Output power	EIA (1% THD, 1 kHz, all channels driven) 4 x 1100 W at 8 Ω (4 x 1300 W peak) / 4 x 1800 W at 4 Ω (4 x 2500 W peak)
Max output voltage	150 V (Peak voltage, no load)
Circuitry	Class D
Digital Signal Processor (DSP)	DSP SHARC 32 bits / floating point, 96 kHz sampling rate
Frequency range	10 Hz-20 kHz (±1.5 dB at 8 Ω)
Distortion THD+N (typical)	< 0.05 % (20 Hz-20 kHz, 8 Ω, 11 dB below rated power)
Output dynamic range	112 dB (20 Hz-20 kHz, 8 Ω, A-weighted)
Amplification gain	32 dB
Noise level	-72 dBV (20 Hz-20 kHz, 8 Ω, A-weighted)
Channel separation	> 85 dB (at 1 kHz)
Damping factor	> 600 (8 Ω, 1 kHz and below)

Mains input power and current draw (all channels driven)

Maximum output power			Mains input power and current draw		
Load	Nb. of channel	Power	1/3 Output Power (-5 dB)	1/8 Output Power (-9 dB)	IDLE
4 Ω	4 x	1800 W	22 A / 3100 W	11 A / 1500 W	0.4 A / 100 W
8 Ω	4 x	1100 W	15 A / 1950 W	10 A / 1300 W	

The current values are given for mains rated at 230 V. Multiply by 2 for 120 V, 1.15 for 200 V, and 2.3 for 100 V.
If the voltage outsides a plus or minus 10 % range, the maximum power is no longer guaranteed.

Mains ratings	LA8 & LA8US: 120/230 V AC (±10 %), 50-60 Hz LA8JP: 100/200 V AC (±10 %), 50-60 Hz
Operating temperature	From -5°C to +50°C (environment) From -5°C to +85°C (internal)
Circuits protection	Temperature monitoring of transformers and heat-sinks, inrush-current limitation, mains supply failure and over-voltage detection, output DC protection, output over current protection
Transducers protection	**L-DRIVE** thermal and over excursion monitoring
Fans	2 temperature dependent speed-controlled axial fans
Indicators	LED for Load, Signal, Level (-25 dB, -10 dB, -5 dB), Clip, L-NET, and Mute
Output Connectors	2x 4-point SpeakON® (1/2 and 3/4 output channels) 1x 8-point CA-COM® (all output channels)
L-NET connectors	2x Fast Ethernet RJ45 (in/out)

ANALOG INPUTS

Connectors	Input	2 Neutrik® female XLR3, IEC 268, ESD protected
	Link	2 Neutrik® male XLR3, IEC 268, ESD protected
Input impedance	22 kΩ (balanced)	
Max input level	22 dBu (balanced, THD 1 %)	
Latency	3.9 ms	
Digital conversion	Two cascaded 24 bit A/D converters (130 dB dynamic range)	

DIGITAL INPUT

Connectors	Input	1 Neutrik® female XLR3, IEC 268, ESD protected
	Link	1 Neutrik® male XLR3, IEC 268, ESD protected, electronically buffered, failsafe relay
	USB	1 Mini-B type female USB, reserved for future applications
Supported input formats	Standard	AES/EBU (AES3) or coaxial S/PDIF (IEC 60958 Type II)
	Sampling frequency (Fs)	44.1, 48, 64, 88.2, 96, 128, 176.4, or 192 kHz
	Word length	16, 18, 20, or 24 bits
XLR cabling	Standard	XLR3 cables, common or AES/EBU certified
	Maximum length	300 m with AES/EBU certified cables and for Fs ≤ 48 kHz
Input gain	Adjustable from -12 dB to +12 dB by 0.1 dB steps	
Latency	3.4 ms or 3.9 ms (upon user selection, independent of the input sampling frequency)	
Sample Rate Converter	Sampling frequency	96 kHz (SRC referenced to the amplified controller's internal clock)
	Word length	24 bits
	Dynamic range	140 dB
	Distortion (THD+N)	< -120 dBfs
	Bandpass ripple	±0.05 dB (20 Hz-40 kHz, 96 kHz)
AES/EBU to ANALOG fallback	Switchover conditions	No clock, loss of lock, invalid audio [validity bit], CRC error, bipolar encoding error, data slip
	Constant delay	Yes (upon user selection, independent of input Fs)
	Constant level	Yes (upon user adjustment of AES/EBU input gain, independent of input Fs)
	Revert to AES/EBU	Manual user selection

9 APPENDIX: LA-POWER US

9.1 LA-RAK and LA-POWER US presentation

A 120 V version of the LA-RAK touring rack is also available for use in the USA and countries using the same electric standards. It features the same characteristics as the European version except for the power panel, which is referenced as the LA-POWER US.

Figure 36: Equipped LA-RAK for USA

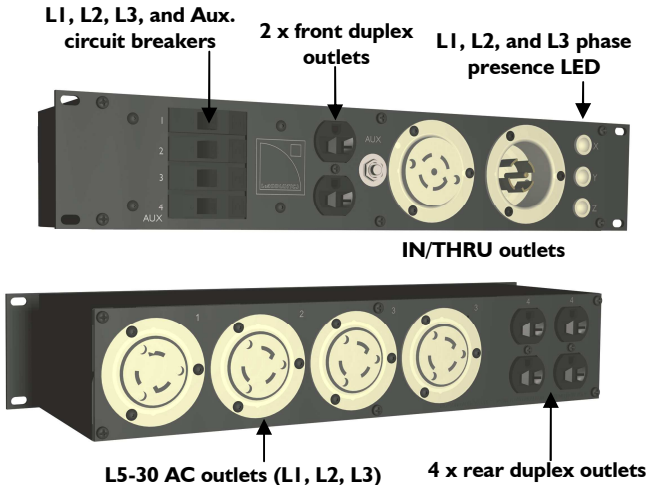


Figure 37: The LA-POWER US

9.2 Connecting LA-RAK US to AC mains

9.2.1 LA-POWER US three-phase circuit

The LA-POWER US connects to **120 V (±10 %) / 30 A three-phase AC mains** using the male L-21 IN outlet.

VOLTAGE

The LA-POWER US only connects to three-phase AC mains rated 120 V (±10 %) / 30 A, 50 - 60 Hz.
Contact a local L-ACOUSTICS® distributor for countries in which this standard does not apply

CAUTION

A maximum of one LA-RAK can be connected per AC mains outlet.
Never use the female L-21 THRU outlet.

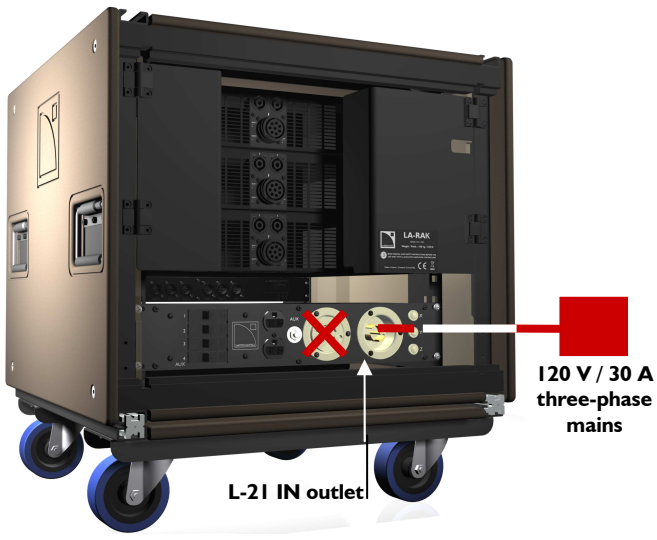
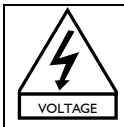


Figure 38: Connection of the LA-RAK US to AC mains

9.2.2 LA-POWER US mono-phase circuits



Connect LA-RAK US to AC mains **only if** the operating voltage indicated on the LA8 back panels corresponds to the local AC mains rating.

Two LA8 versions are available (also refer to the **LA8 User Manual** [3.4]):

- A universal 120/230 V (±10 %) version fitted with automatic switch mode power supply.
- A specific 100 V (±10 %) version for Japan.

The LA-POWER US three-phase circuit powers the three mono-phase circuits corresponding to the three L5-30 female outlets located on the rear face (L1, L2, and L3). These last allow connection of the three LA8 amplified controllers mounted in the LA-RAK US (see Figure 39).

Each outlet is protected by a **30 A** circuit breaker located on the front face and three LED help monitor the presence of each phase on the front end of the mains circuit.

The LA-POWER US also includes an **auxiliary circuit** protected by the "Aux" **20 A** circuit breaker. This circuit powers six duplex outlets located on the front and rear faces to connect portable computer and the like as well as additional Ethernet® switches.

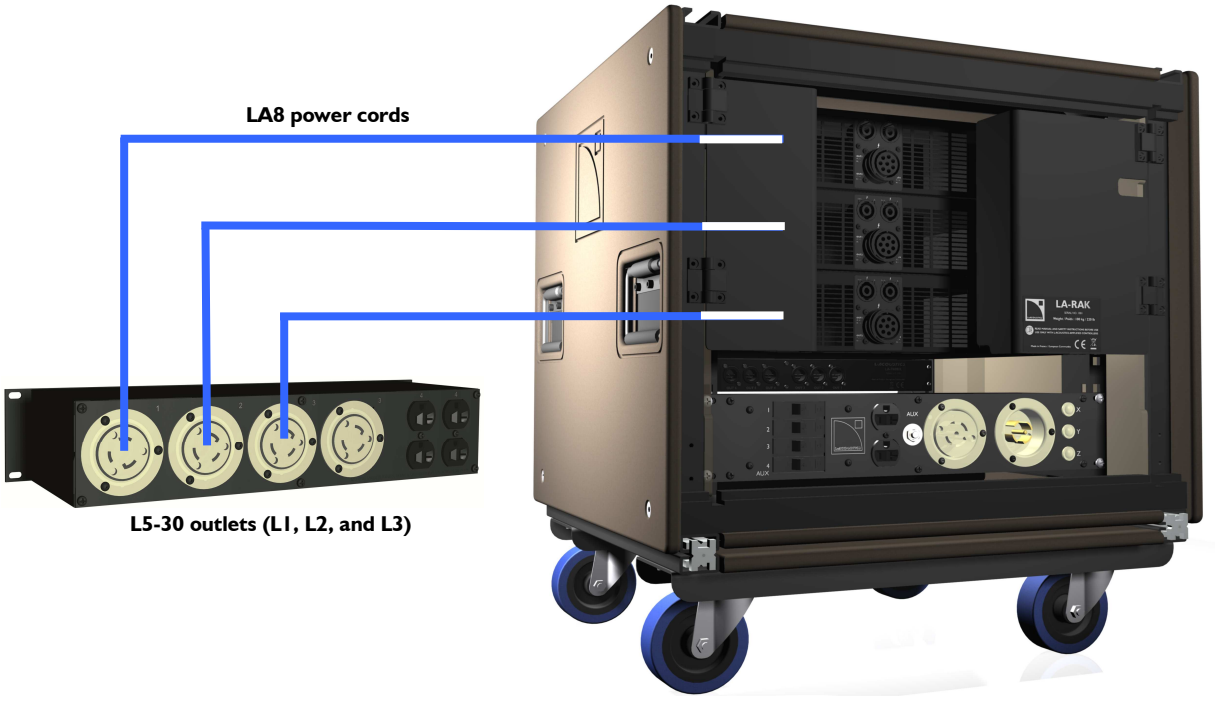


Figure 39: Powering three LA8 within an LA-RAK (LA-POWER external rear view)

Document Reference: LARAK_UM_EN_2.0

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